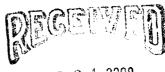


March 20, 2008

Alex M. Barron Fish Tissue and Sediment Monitoring Program Virginia Department of Environmental Quality P.O. Box 1105 Richmond, VA 23218



MAR 2 4 2008

Northern Va. Region Dept. of Env. Quality

RE: Louisa County Regional Wastewater Treatment Plant Expansion Final Streamlined Water Effects Ratio Report

Dear Mr. Barron:

Please find enclosed an updated report for the Louisa County Regional Wastewater Treatment Plant (WWTP) Streamlined Water-Effect-Ratio (WER) for Copper. The final report includes supplemental sampling carried out in February 2008 to address concerns raised by DEQ over one of the original samples reported in 2007. The original sample, collected in July 2007, had a Total Suspended Solids measurement of 81 mg/l which was significantly higher than the permitted limit of 15 mg/l (weekly average).

The third effluent sample was collected on February 20, 2008. The CBOD in the effluent was non-detect (<2.0 mg/l), ammonia was 0.28 mg/l, and TSS was 10 mg/l. All of these parameters were within the permitted discharge limits, indicating that the WWTP was operating normally during the sampling event.

The WER value for the February study is 16.94. The final WER value, utilizing the original May 2007 data and the February 2008 data, is 15.70.

If you have any questions concerning this WER report please feel free to give me a call.

Sincerely,

Dewberry & Davis, Inc.

J. Ryan Moyers, P.E. Project Engineer

Enclosures

cc: Alison Thompson, DEQ NVRO w/ Enclosure

Bar Delk, LCWA w/ Enclosure

Brian Marks, Town of Louisa w/o Enclosure

Dick Sedgley, AquaLaw w/ Enclosure

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# STREAMLINED WER FOR COPPER REPORT SUPPLEMENTAL SAMPING EVENT

## LOUISA COUNTY WATER AUTHORITY: LOUISA REGIONAL STP

**MARCH 2008** 

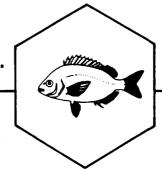


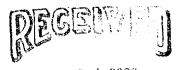
MAR 2 4 2008

Northern Va. Region Dept. of Env. Quality

REPORT SUBMITTED TO: DEWBERRY GLEN ALLEN, VIRGINIA

SHEALY ENVIRONMENTAL SERVICES, INC.





MAR 2 4 2008

Northern Va. Region Dept. of Env. Quality

# STREAMLINED WER FOR COPPER REPORT SUPPLEMENTAL SAMPING EVENT

LOUISA COUNTY WATER AUTHORITY: LOUISA REGIONAL STP

**MARCH 2008** 

REPORT SUBMITTED TO: DEWBERRY GLEN ALLEN, VIRGINIA

**REPORT SUBMITTED BY:** 

SHEALY ENVIRONMENTAL SERVICES, INC.

1833 Airport Boulevard, Suite D

West Columbia, South Carolina 29172

# STREAMLINED WER FOR COPPER REPORT SUPPLEMENTAL SAMPING EVENT

## LOUISA COUNTY WATER AUTHORITY: LOUISA REGIONAL STP

## **MARCH 2008**

This report includes a full text account of the February 20, 2008, sampling event and WER study for copper. The attached appendices contain all raw data including sampling data, toxicity test reports, and analytical reports:

Appendix A: Sample Collection Data

Appendix B: Toxicity Test Reports

Appendix C: Analytical Reports

Appendix D: Copper Toxicity Control Chart

## STREAMLINED WER FOR COPPER FULL TEXT REPORT SUPPLEMENTARY SAMPLING

## LOUISA COUNTY WATER AUTHORITY: LOUISA REGIONAL STP

### **MARCH 2008**

## **SECTION 1: Introduction**

The Louisa County Water Authority owns and operates the Louisa Regional STP near the intersection of State Route 22 and U.S. Route 33. The facility discharges into Beaver Creek in the York River Basin. The facility has a discharge permit, (VA0067954), which has a proposed monthly average copper limit of 0.0055 mg/L as total recoverable, and a weekly average copper limit of 0.0055 mg/L. Because the National Criteria for metals published by the USEPA are admittedly overly-protective for many facilities and their receiving streams, the USEPA (1994) and the State of Virginia (9VAC25-260F) have allowed the development of site-specific criteria. One method of developing site-specific metals criteria is the Water-Effect Ratio (WER) study. A WER study produces a multiplier which may be applied to the EPA's National Criteria for copper, thus increasing the facility's final permit limits for copper.

In conjunction with Dewberry, a copper Streamlined WER study was performed in 2007 for the Louisa Regional STP by Shealy Environmental Services, Inc. Two studies were completed in accordance with the Streamlined Method. The first was performed on May 16, 2007. Effluent and receiving stream samples were collected May 14-15, 2007. The WER determined with Ceriodaphnia dubia (a freshwater invertebrate in the family Cladocera) was 14.56 for total copper. The second WER study was performed July 18, 2007, using effluent and receiving stream samples collected July 16-17, 2007. The resulting total copper WER value was 23.11 for total copper. The final water-effect ratio (FWER) was determined as the geometric mean of the two C. dubia WER values. The FWER developed for the Louisa Regional STP was 18.34.

Upon technical review by the State of Virginia Department of Environmental Quality (DEQ), it was noted that the total suspended solids (TSS) measurement on the July sample was elevated. Because the TSS measurement of 81 mg/L was significantly higher than the permitted limit of 15 mg/L (weekly average), the effluent sample was considered atypical. A third sampling event was requested by VADEQ in January of 2008.

In response to the VADEQ request for additional sampling, personnel of Shealy Environmental Services, Inc. collected a third composited effluent sample at the Louisa Regional STP on February 20, 2008. All chemical parameters were in compliance with monitoring requirements. With a WER value for the study of 16.94, the new final WER (FWER) value calculated using the May 2007 and the February 2008 data is 15.70.

The study adhered to EPA 823-B-94-001, Interim Guidance on Determination and Use of Water-Effect Ratios for Metals, as well as the Streamlined Method document, Streamlined Water-Effect Ratio Procedure for Discharges of Copper (EPA-822-R-01-005). For detailed toxicity testing guidance, Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA 821-R-02-012, was used.

## Section 2: Copper Water-Effect Ratio Study #3

## 2.1 Sampling Information

On February 19, 2008, an ISCO® composite sampler was set-up by personnel of Shealy Environmental Services, Inc. at the Louisa STP to collect final effluent from the flume following ultra-violet disinfection. The compositor unit was fitted with Teflon® tubing and a Teflon®-lined strainer. All equipment including the glass collection jar, strainer, and tubing, was acid-washed prior to use. De-ionized laboratory water was pumped through the compositing unit, and an aliquot was preserved with nitric acid for total copper analysis as an equipment blank. The compositor was programmed to begin sampling at 1200 on February 19, 2008, and to collect 150 ml of effluent every 15 minutes for 24 hours. The effluent temperature at sample collection was 9.2°C, the effluent pH was 6.70 SU, and the effluent TRC measured <0.1 mg/L.

On February 20, 2008, a filtration station was set-up adjacent to the compositing unit on clean plastic sheeting in order to filter upstream water and effluent at 0.45 microns for dissolved metals analysis. The station consisted of a vacuum pump and two sealed, disposable Nalgene® filter units. During sampling and filtration, one technician was designated to have 'clean' hands, and one 'dirty' hands. Both technicians wore non-powdered nitrile gloves.

Two gallons of receiving stream water were collected from Beaver Creek upstream from the treatment plant outfall on February 20, 2008, at 1000. Samples were taken at a point approximately half-way between the outfall and the pipe running under the golf course bridge. Beaver Creek flow above the STP outfall was determined to be 0.172 MGD with a Global Water® digital flow probe. The receiving stream temperature was 3.9°C, and the pH was 7.42 SU. The Beaver Creek sample was transported to the filtration station. De-ionized water was pumped through one of the filter units at 1045 and preserved with nitric acid as a filtration blank for copper. At 1050, an aliquot of upstream water was filtered and preserved with nitric acid for dissolved metals analysis. An unfiltered aliquot of upstream water was preserved with nitric acid for total metals analysis.

The effluent sample was removed from the compositing unit at 1158 on February 20, 2008. A filtration blank was collected using a new Nalgene® filtration unit at 1205. At 1210, an aliquot of effluent was immediately filtered and preserved for dissolved metals analysis. An unfiltered aliquot was preserved with nitric acid for total metals analysis.

Samples were packed on ice for transport. The samples were received at the Shealy Environmental Services Inc., Main Laboratory on February 21, 2008, at 0930. The TRC of the effluent measured at sample receipt was 0 mg/L. A receipt temperature of 3.8°C was documented for the temperature blank in the sample cooler. The effluent sample was assigned the unique lot number JB21066, and the receiving stream was assigned the unique lot number JB21068. The samples were maintained in a walk-in refrigeration unit set between 0 and 4°C until transferred to the Toxicity Laboratory at 1833 Airport Boulevard.

Weather conditions for 14 days prior to sample collection were obtained from monitoring reports provided by the National Weather Service for the Louisa Regional Airport. The compositor and filtration blanks contained less than 1  $\mu$ g/L copper. Analytical reports are in Appendix C. All other sampling data including Chain-of-Custody forms, weather history, and receiving stream flow data are provided in Appendix A.

### 2.2 Sampling Conditions

Receiving stream flow during sample collection was reported as 0.172 MGD upstream from the WWTP outfall. The WWTP flow during sampling was 0.30365 MGD. The CBOD measured in the effluent was non-detect (<2.0 mg/L), ammonia was 0.28 mg/L, and TSS was 10 mg/L. All of these parameters were within the permitted discharge limits, indicating that the WWTP was operating normally during the sampling event.

#### 2.3 Copper Source for Study #3

The copper source for Study #3 was cupric sulfate pentahydrate (CuSO<sub>4</sub>\*5H<sub>2</sub>O) obtained from Fisher Scientific. The Fisher lot number for the copper used was 063393, and the container of cupric sulfate designated as SHEALY # T01-186 (expires 09/01/2008). A primary copper stock was prepared on February 20, 2008, by adding 1.00003 g cupric sulfate pentahydrate to 1 liter deionized water in a volumetric flask.

### 2.4 LABWATER Test Dilutions for Study #3

Laboratory dilution water used for in-house cultures and toxicity testing was prepared on February 14, 2008, and was designated EPA-914. The water was prepared according to the procedure for obtaining moderately hard synthetic dilution water found in Section 7 of EPA 82-R-02-012, Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Well water was obtained from an on-site well, and was filtered through catalytic carbon and a reverse osmosis membrane prior to the addition of reagent-grade chemicals. A copy of the documentation form for EPA-914 is provided in Appendix B. Ceriodaphnia dubia neonates used in the WER study were born into this batch of water.

A LABWATER sub-stock of cupric sulfate was prepared on February 21, 2008, by diluting 2 ml of the primary copper stock (see Section 2.3) to 500 ml with EPA-914. This provided a LABWATER sub-stock with a nominal copper concentration of 1 mg/L. The test dilutions were prepared by combining the LABWATER sub-stock with un-spiked EPA-914 to obtain the following nominal copper concentrations: 2.5, 3.9, 6.0, 9.1, 14, and 21 µg/L. Acid washed Class 'A' pipettes and cylinders were used to prepare sub-stocks and dilutions.

Table 1: Preparation of LABWATER test dilutions for the Louisa Regional STP WER study conducted February 21, 2008.

Treatment (% LABWATER Sub-stock)	Nominal Copper Concentration (µg/L)	LABWATER Sub-stock Added (ml)	Dilution
Lab. Control	0	0	To 600 ml with EPA-914
0.25	2.5	1.5	To 600 ml with EPA-914
0.39	3.9	2.3	To 600 ml with EPA-914
0.60	6.0	3.6	To 600 ml with EPA-914
0.91	9.1	5.5	To 600 ml with EPA-914
1.4	14	8.4	To 600 ml with EPA-914
2.1	21	12.6	To 600 ml with EPA-914

All LABWATER dilutions were prepared by 0845 on February 21, 2008. A 200 ml aliquot of each dilution was preserved with nitric acid for total copper analysis. A separate 200 ml aliquot was filtered at 0.45 µm using a new Nalgene® analytical filter unit and preserved with nitric acid for dissolved copper analysis. The remaining solution was used for toxicity testing.

## 2.5 SIMSTREAM Test Dilutions for Study #3

Simulated Stream water (SIMSTREAM) for Study #3 was prepared by combining Louisa Regional STP final effluent and upstream receiving stream water at the design low-flow conditions (Instream Waste Concentration, or IWC). The 7Q10 of the receiving stream is 0.003 MGD (Attachment 7 for VA0067954), so for a plant design flow of 0.8 MGD, the IWC is 99.6% effluent.

To prepare the SIMSTREAM, 20 ml of receiving stream water was screened at 60µm for indigenous organisms, and combined with 4980 ml effluent. Aliquots of LABWATER, SIMSTREAM, effluent, and receiving stream water were submitted for chemical characterization (see Section 2.6). The hardness value reported by the SHEALY analytical laboratory of 57 mg/L was used to normalize the SIMSTREAM test results to the permit hardness of 39 mg/L prior to the calculation of WER values.

A SIMSTREAM sub-stock of cupric sulfate was prepared by diluting 2 ml of the primary copper stock (see Section 2.3) to 500 ml with SIMSTREAM. This provided a sub-stock with a nominal copper concentration of 1.0 mg/L. The test dilutions were prepared by combining the SIMSTREAM sub-stock with un-spiked SIMSTREAM to obtain the following nominal copper concentrations: 32, 49, 75, 116, 179, 275, and 423  $\mu$ g/L. Acid washed Class 'A' pipettes and cylinders were used to prepare sub-stocks and dilutions.

Table 2: Preparation of SIMSTREAM test dilutions for the Louisa Regional STP WER study conducted February 21, 2008.

Treatment (% SIMSTREAM Sub-stock)	Nominal Copper Concentration (µg/L)	SIMSTREAM Sub-stock Added (ml)	Dilution
Lab. Control	0	0	EPA-914
Rec. Stream	0	0	Receiving Stream
SIMSTREAM	0	0	SIMSTREAM
3.2	32	12.8	To 400 ml with SIMSTREAM
4.9	49	19.6	To 400 ml with SIMSTREAM
7.5	75	30.0	To 400 ml with SIMSTREAM
11.6	116	46.4	To 400 ml with SIMSTREAM
17.9	179	71.6	To 400 ml with SIMSTREAM
27.5	275	110	To 400 ml with SIMSTREAM
42.3	423	169	To 400 ml with SIMSTREAM

SIMSTREAM test dilutions were prepared by 1045 on February 21, 2008. A 125 ml aliquot of each dilution was preserved with nitric acid for total copper analysis. A separate 125 ml aliquot was filtered at  $0.45~\mu m$  using a new Nalgene® analytical filter unit and preserved with nitric acid for dissolved copper analysis. The remaining solution was used for toxicity testing.

#### 2.6 Analytical Profile of Test Waters

Table 3: Analytical measurements for LABWATER, effluent, SIMSTREAM, and receiving stream water taken February 21, 2008. Full analytical reports including complete metal scans are available in Appendix C.

Parameter	meter LABWATER SIMSTREAM			Receiving Stream
CBOD			<2.0 mg/L	
Specific Conductance	287 µmhos/cm	322 µmhos/cm	384 µmhos/cm	105 µmhos/cm
TSS	<4.0 mg/L	6.9 mg/L	10 mg/L	<4.0 mg/L
Alkalinity	62 mg/L	81 mg/L	40 mg/L	26 mg/L
TOC	<1.0 mg/L	9.9 mg/L	9.5 mg/L	4.3 mg/L
DOC	<0.5 mg/L	5.774 mg/L	6.652 mg/L	3.444 mg/L
Ammonia-N	<0.10 mg/L	<0.01 mg/L	0.28 mg/L	<0.10 mg/L
Hardness	88 mg/L	57 mg/L	57 mg/L	35 mg/L
Total Copper	<5.0 μg/L	14 μg/L	17 μg/L	<5.0 μg/L
Dissolved Copper	<5.0 μg/L	8.8 μg/L	7.0 µg/L	<5.0 μg/L

We investigated the alkalinity value for the SIMSTREAM of 81 mg/L. It should have been at or below 40 mg/L, since the effluent comprised over 99% of the SIMSTREAM. We had the sample re-analyzed twice with the same results. We then re-analyzed the effluent remaining in the CBOD sample container for alkalinity. Effluent alkalinity was confirmed at 40 mg/L. All other SIMSTREAM parameters are at expected levels.

#### 2.7 Toxicity Test Results for Study #3

Test solutions were allowed to equilibrate at least 2 hours prior to test initiation. Each test treatment consisted of 4 test chambers with 5 *C. dubia* each, and one surrogate test chamber with 5 organisms for water chemistry measurements only (D.O., pH, and temperature). The test chambers for the LABWATER test, the SIMSTREAM test, and all surrogates were filled with test solution and randomized on a single test board. The test organisms were introduced into chambers by rows without de-randomizing the chambers at 1600 on February 21, 2008. Test organisms were obtained from in-house cultures with a traceable lineage. The *C. dubia* used in this test were designated B3248, and were born between 1630 on February 20, 2008, and 0830 on February 21, 2008. Test organisms were fed two hours prior to the initiation of the test during holding at 25±1°C, but food was not introduced into actual test solutions. Dissolved oxygen, pH, and temperature were measured for each test concentration at test initiation. The test board was placed in Incubator #4 set for a temperature of 25±1°C, and a 16 hour light / 8 hour dark cycle.

At 24 hours, the test board was removed from the incubator. D.O., pH, and temperature were recorded in the surrogate chambers for each test concentration. Mortality was recorded for each replicate, and the test board placed back into the incubator.

The toxicity tests were terminated on February 23, 2008, by 1615. Immediately after mortality was recorded, appropriate test solutions were filtered at 0.45 microns and preserved with nitric acid for dissolved copper analysis. Pre-packaged Nalgene® analytical filter units were used to filter the solutions. The solutions submitted were all controls, the highest LABWATER and SIMSTREAM test concentrations at which there was no mortality, all test concentrations having partial mortality, and the lowest LABWATER and SIMSTREAM test concentrations having complete mortality. Dissolved oxygen, pH, and temperature were measured for each test concentration at test termination.

Toxicity test reports for the LABWATER and both SIMSTREAM tests are available in Appendix B. Analytical reports are in Appendix C. All water chemistry parameters were within the expected ranges. Temperature remained within 25± 1°C, and D.O. remained well above the required 6.0 mg/L (EPA 821-R-02-012). Table 4 provides a summary of temperature and D.O. measurements taken during testing. Survival was 100% in the laboratory dilution water controls, receiving stream control, and un-spiked SIMSTREAM treatment.

Table 4: Summary of temperature and dissolved oxygen measurements taken during the *C. dubia* tests for the Louisa Regional STP WER study on February 21, 2008.

Test	Temperature Range (°C)	Average Temperature (°C)	D.O. Range (mg/L)	Average D.O. (mg/L)
LABWATER	24.0 – 24.7	24.4	6.75 - 8.46	8.24
SIMSTREAM	24.0 – 24.7	24.3	6.56 – 8.51	8.21

Table 5: Summary of toxicity test results and actual metal measurements for the Louisa Regional STP LABWATER test with *C. dubia* conducted February 21, 2008.

Treatment (% LABWATER Sub-stock)	Initial Concentration Copper Total / Dissolved (µg/L)	Final Concentration Copper Dissolved (µg/L)	Mortality at 48 Hours
Lab Control	<1.0 / <1.0	<1.0	0%
0.25	2.5 / 2.4	*	0%
0.39	3.6 / 3.7	*	0%
0.60	6.0 / 5.8	4.8	0%
0.91	9.3 / 9.1	13	80%
1.4	17 / 17	14	100%
2.1	24 / 24	*	100%

<sup>\*</sup> Analysis of final dissolved copper is not required for this test concentration.

Table 6: Summary of toxicity test results and actual metal measurements for the Louisa Regional STP SIMSTREAM test with *C. dubia* conducted February 21, 2008.

Treatment (% SIMSTREAM Sub-stock)	Initial Concentration Copper Total / Dissolved (µg/L)	Final Concentration Copper Dissolved (µg/L)	Mortality at 48 Hours
Lab Control	<1.0 / <1.0	<1.0	0%
Rec. Stream	1.7 / 2.4	1.4	0%
SIMSTREAM	15 / 7.8	8.7	0%
3.2	53 / 40	*	0%
4.9	67 / 52	*	0%
7.5	100 / 75	*	0%
11.6	140 / 110	100	0%
17.9	200 / 150	150	10%
27.5	310 / 240	230	100%
42.3	470 / 360	*	100%

<sup>\*</sup> Analysis of final dissolved copper is not required for this test concentration.

#### 2.8 Final Copper WER Calculation for Study #3

EC50's were determined using measured total and dissolved copper values for test concentrations. The Probit Method could not be used since one of the tests did not have at least two concentrations with partial mortality. Instead, the Trimmed Spearman-Karber test (TOXCALC v5.0.23) was used to determine 48-hour EC50 values for the LABWATER and SIMSTREAM tests. A standard hardness of 39 mg/L was used to normalize all EC50 data prior to the calculation of WER values. The normalizing equation is from EPA 2001, Appendix B:

 $EC50_{(standard\ hardness)} = EC50_{(test\ hardness)}\ (standard\ hardness/test\ hardness)^{0.9422}\ .$ 

The EC50 for total copper in the LABWATER test was  $8.290 \,\mu\text{g/L}$ . The EC50 was normalized from the reported hardness of 88 mg/L to a standard hardness of 39 mg/L using the published slope for copper of 0.9422, (EPA 2002). The normalized value became 3.851  $\,\mu\text{g/L}$  total copper. The EC50 value for dissolved copper was  $8.090 \,\mu\text{g/L}$ , and was normalized to  $3.758 \,\mu\text{g/L}$ .

The EC50 for total copper in the SIMSTREAM test was 239.3  $\mu$ g/L. The EC50 was normalized from the reported hardness of 57 mg/L to a standard hardness of 39 mg/L using the published slope for copper of 0.9422, (EPA 2002). The normalized value became 167.4  $\mu$ g/L total copper. The EC50 value for dissolved copper was 182.5  $\mu$ g/L, and was normalized to 127.6  $\mu$ g/L.

The Streamlined Method requires that the WER be calculated by dividing the SIMSTREAM EC50 by the greater of either the LABWATER EC50 or the published SMAV (Species Mean Acute Value). For *C. dubia*, the SMAV for total copper at a hardness of 39 mg/L is 9.884 µg/L, and the SMAV for dissolved copper at a hardness of 39 mg/L is 9.105 µg/L (EPA 2001). Since the published SMAV values are greater than the normalized values derived from this study, they were used to calculate the total and dissolved WER values.

The total copper WER value for the study conducted February 21, 2008, with *C. dubia* is 16.94. The dissolved copper WER for the study is 14.01.

Table 7: Summary of copper EC50 values, the associated normalized values, and the calculated copper WER values for the Louisa Regional STP study conducted February 21, 2008, with *Ceriodaphnia dubia*.

	В -	EC50 Copper)	(μg/I Hardnes	EC50 L Copper) s normalized t/L as CaCO3		WER*				
Test	total	dissolved	total	dissolved	total	dissolved				
LABWATER	8.290	8.090	3.851	3.758						
SIMSTREAM	239.3	182.5	167.4	127.6	16.94 14.01					

<sup>\*</sup> Uses SMAV values of 9.884 µg/L for total copper, and 9.105 µg/L for dissolved copper.

### **Section 3: FWER Calculation**

Table 8: Copper WER values derived from the three studies performed for the Louisa Regional STP:

Study Date	Total Copper WER	Dissolved Copper WER
May 16, 2007	14.56	12.84
July 18, 2007	23.11	19.28
February 21, 2008	16.94	14.01

The Final WER (FWER) is calculated as the geometric mean of all valid sample WERs. The second sample (July 2007) was deemed 'invalid' due to an effluent TSS much higher than permit limits. If the May 2007 and the February 2008 WER values are used, the final WER value for total copper is 15.70.

### WER Adjustment to National Criteria:

The hardness used to determine copper limits in the VA0067954 Louisa permit is 39 mg/L. National criteria for copper listed in the permit for a hardness of 39 mg/L are 4.0  $\mu$ g/L (chronic value) and 5.5  $\mu$ g/L (acute value). According to 9 VAC 25-260, the criteria may be multiplied by the WER to establish an in-stream copper concentration that is protective for designated uses.

Site-Specific Chronic Criterion (CCC) = 4.0 (15.70) = 62.8  $\mu$ g/l Cu Site-Specific Acute Criterion (CMC) = 5.5 (15.70) = 86.35  $\mu$ g/l Cu.

## **Section 4: Test Result Comparison**

Table 9: Values published in EPA 2001 for copper toxicity to *Ceriodaphnia dubia*. The values listed were generated with *C. dubia* <24 hours old, at static conditions, and using measured copper values.

REFERENCE	HARDNESS USED IN STUDY (MG/L)	EC50 (UG/L)	EC50 NORMALIZED TO HARDNESS OF 25 MG/L
Dimond, W.F. 2000.	78	13.1	4.48
	90	8.88	2.66
	90	10.3	3.08
Tetra Tech. 1998	99	10.1	2.76
	70	14.65	5.55
	74	6.72	2.42
	72	6.59	2.43
Diamond et al. 1997b.	80	6.98	2.33
Neserke, G. 1994.	87.5	11.25	3.46
	80.8	13.17	4.36
	80.8	25.25	8.36
	60	11.25	4.93
	30	4.5	3.79

The values listed in EPA 2001 were included in this summary table only if they were generated using three criteria: 1) the *C. dubia* tested were less than 24 hours old, 2) the test was conducted under static conditions, and 3) measured copper values were used to determine EC50s. Using the EC50 values normalized to a hardness of 25 mg/L, the average total copper EC50 for the EPA values is 3.89  $\mu$ g/L. The upper limit using 2 standard deviations is 7.29  $\mu$ g/L, and the lower limit is 0.49  $\mu$ g/L.

A copy of the recent Shealy Environmental Services reference control chart for copper is included as Appendix D. The control chart includes all copper studies in LABWATER from May 10, 2006, through January 22, 2008. All values were normalized to a hardness of 25 mg/L prior to inclusion in the chart. The control chart mean is  $2.56 \,\mu\text{g/L}$  copper, with an upper limit of  $3.59 \,\mu\text{g/L}$  and a lower limit of  $1.53 \,\mu\text{g/L}$ .

Table 10 provides the *C.dubia* EC50 data from all three Louisa Regional STP WER studies in comparison to the EPA published copper EC50 values and Shealy Environmental Services, Inc. copper EC50 data.

Table 10: Comparison of EC50 values generated for *C. dubia* <24 hours old. All studies referenced were generated under static conditions with EC50 values calculated using measured total copper. All EC50 values are normalized to a hardness of 25 mg/L.

Study/Facility	Mean EC50 Value (μg/L)	Range (2SD) (µg/L)
Shealy Environmental Services, Inc.	2.56	1.53 – 3.59
Values Published in EPA 2001	3.893	0.49-7.29
Louisa STP Study #1	2.178	
Louisa STP Study #2	1.895	
Louisa STP Study #3	2.532	gradient of the state of the st

## Section 5: Blank Analysis Results

Blanks were collected for copper analysis at various points during the WER studies. All analytical reports for the blanks are provided in Appendix C.

For Study#3, the equipment blank, filtration blanks, resulted in non-detect copper values (<1.0  $\mu$ g/L). All glassware blanks resulted in values less than 5  $\mu$ g/L.

## Section 6: References

- US Environmental Protection Agency (1994). Interim Guidance on Determination and Use of Water-Effect Ratios for Metals. EPA 823-B-94-001. Office of Water, Washington, D.C.
- US Environmental Protection Agency (1995). 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA 820-B-96-001. Office of Water, Washington, D.C.
- US Environmental Protection Agency (2001). Streamlined Water-Effect Ratio Procedure for Discharges of Copper. EPA-822-R-01-005. Office of Water, Washington, D.C.
- US Environmental Protection Agency (2002). Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition EPA 821-R-02-012. Environmental Research Laboratory, Duluth, MN.
- US Environmental Protection Agency (2002). National Recommended Water Quality Criteria: 2002. EPA-822-R-02-047 November 2002. Office of Water, Washington, D.C.

# STREAMLINED WER FOR COPPER REPORT SUPPLEMENTAL SAMPING EVENT

## LOUISA COUNTY WATER AUTHORITY: LOUISA REGIONAL STP

**MARCH 2008** 

This final report includes a full text report and all raw data including toxicity test reports and analytical reports for the February 20, 2008, sampling event.

## **APPENDIX A**

# SHEALY Chain of Custody Record

## SHL.../ EN....ONI.....TAL J.RVICLO, INC.

106 Vantage Point Drive • West Columbia, SC 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111 www.shealylab.com

Number 07319

Client			Report to	Conta	ct 2H	 }	Th	iom	nos	ണ				Telep	hone N	Vo. /	Quote f	lo.								
Address			Sampler's	Sign	ature	. 1		•	^	1				Wayt	oill No.									Page_	1 of 1	
City State	Zip Co	ode	$\neg x$	120	bo	th	G	<u>ڻ.</u>	4	hor	тр	<u>~</u>					Ai	nalysi	s (Atta	ach lis	t if mo	re sp	oace i	is needed.)		
			Printed N	Report to Contact  Beth Thompson  Sampler's Signature  x Chiabeth W. Thompson  Printed Name									Fie	ld Pa	ramete	ers (i.e	e., pH,	can	be re	ecorded in c	heck boxes.					
Project Name Dewberry / h	ou	i sa											· · ·	Analysis (Attach III								/	//	///		
Project No.		P.O. No.		rab posite	tion emp 'C	Ma	trix	by	/ Pres	e of Co ervativ 3=Glass	e Type	9	PATE		<u> </u>	Ś	64	08/2	'/	//	//	/	/ /	//_	Lot No.	
Sample ID / Description (Containers for each sample may be combined on one line.)	1	Date 2008	Time 24-HOUR	G=Grab C=Composite	Collection Sample Temp	Aqueous	Solid	Unpres.	H2SO4	HNO3	HCI	NaOH	SODIUM		(a)/V	30	213	/	//	//	//	/	/	/	B	
1 0 1	Start									1																
Compositor Blank	Finish	19	1150							P					X											
Effluent	Start	19	1200					1		t											ļ					
Difficery		20	1158					6		P				X	X									Fi Hrat		
Filtration Blank Finish										1					4								1	Onit	Mo,B	, Sn <sub>i</sub> T
111Trayion Wank	Finish 2	20	1205	-						P					WI.	X								<del></del>		
Filtered Effluent	Finish	20	1210							1				_		X								)		
	Start	<i>a</i> C	18210							<u> </u>							-			-		+	1			
	Finish									-		-	T													
Turn Around Time Required (Prior lab approval requii  ☐ Standard ☐ Rush (Specify)	ed for ex	pedited TAT.	Sample Disp		⊐ Disį	oosal	by L	ł	C Re	quire	ment	s (Sp	ecify)		.1		Possit □ Non						Skin Ir	rritant 🗆 Po	oison 🗆 Ur	ıknown
1. Relinquished by Eliabeth D. Thompso 2. Relinquished by	C	)	2/21	\08	Tir (	j°9	4	1.	. Rec	eiv <b>e</b> a	by										Di	ate		Time		
2. Relinduished by			Date		Tir	ne		2	. Rec	eived	by										Di	ate		Time		
3. Relinquished by		Date		Tir	ne		3.	. Rec	eivea	by	$\sim$									Di	ate		Time			
4. Relinquished by			Date	Date Time				4	4. Laboratory Received by				of By	· · · · · · · · · · · · · · · · · · ·								atd 2	1/0	Time	093	
Note: All samples are ret unless other an				ceip	!					ISE O		(Circle	e) (	િક	No I	lce P	ack	Re	eceipt	Тетр		3.8		C Temp. E	Blank (Y) N	

Shealy Environmental Services, Inc. Document Number: F-AD-016 Revision Number: 6

Sample Receipt Checklist (SRC)

Page 1 of 1 Replaces Date: 09/22/06 Effective Date: 05/29/07

Cooler Inspected by/date: <u>CS</u> /**02/21/08**\_ot #: <u>TB21068</u> Client: Other FedEx Airborne Exp Means of receipt: SESI ☐ UPS Client NA 1. Were custody seals present on the cooler? No Yes 🗍 2. If custody seals were present, were they intact and unbroken? Yes  $\square$ 3./8\_.°C \_ Cooler ID/temperature upon receipt\_ °C °C °C °C °C Against Bottles Method: Temperature Blank None Blue Ice Dry Ice **₩et** Ice Method of coolant: If response is No (or Yes for 14, 15, 16), an explanation/resolution must be provided. 3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other:\_\_\_\_\_. (For NA Yes  $\square$ No  $\square$ coolers received via commercial courier, PMs are to be notified immediately. 4. Is the commercial courier's packing slip attached to this form? NA Yes No [ 5. Were proper custody procedures (relinquished/received) followed? NA № П Yes 🖊 6. Were sample IDs listed? Yes 🖊 NA Nol 7. Was collection date & time listed? NA Yes 🖊 No 🗌 8. Were tests to be performed listed on the COC or was quote # provided? NAΓ Yes No [ 9. Did all samples arrive in the proper containers for each test? NA No  $\square$ Yes 🖊 10. Did all container label information (ID, date, time) agree with COC? NA Yes No 11. Did all containers arrive in good condition (unbroken, lids on, etc.)? NA [ No  $\square$ Yes 🖊 12. Was adequate sample volume available? No 🗌 NA Yes 13. Were all samples received within ½ the holding time or 48 hours, whichever NA  $\square$ No  $\square$ Yes 🖊 comes first? 14. Were any samples containers missing? No 🗖 NA  $\Gamma$ Yes [ 15. Were there any excess samples not listed on COC? No 📑 NA [ Yes 16. Were bubbles present >"pea-size" (1/4" or 6mm in diameter) in any VOA NA 🖊 No 🗍 Yes 🔲 17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2? NA 🗆 Yes 🖊 No  $\square$ 18. Were all cyanide and/or sulfide samples received at a pH >12? NA Yes No 🗌 19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb NA 🗌 Yes 🖊 No  $\square$ (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine? 20. Were collection temperatures documented on the COC for NC samples? NA 🗖 No [ Yes Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.) were received incorrectly preserved and were adjusted Sample(s) accordingly in sample receiving with \_\_\_\_\_(H<sub>2</sub>SO<sub>4</sub>,HNO<sub>3</sub>,HCl,NaOH) with the SR # (number) were received with bubbles >6 mm in diameter. Sample(s) were received with TRC >0.2 mg/L for NH3/ Sample(s) TKN/cyanide/BNA/pest/PCB/herb. were received with TRC > 0.1 mg/L and were Toxicity sample(s) analyzed by method 330.5. Corrective Action taken, if necessary: Did client respond: Yes No Was client notified: Yes No Date of response: SESI employee: Comments:

Lot: JB21068

## Sample Receiving Summary

Printed: 02/21/2008 8:30:44 PM by CB

Quote: 11066

Client: (1164) Shealy Environmental Services, Inc. / Beth Thompson

Project Manager: GRW

Comments:

Program Area: SC - NPDES

Project Name:

PO Number:

Project Number:

Analysis Due: 03/04/2008 Report Due: 03/07/2008 Level 1 Review:

Level 2 Review:

Cooler#

Cooler ID (if applicable)

Temp (°C) 3.8

Comments

1

Shealy ID: JB21068-001 Client ID: Receiving Stream Collected: 02/20/2008 at 1000 by EWT

Sample Receiving Matrix: Aqueous

Received: 02/21/2008 0930 by ECC

Entered: 2/21/2008 by CB

Receipt Method: Field Services

Sample Containers:

**Qty** 

Sample Containers

Comments

Tests:

(033) No Sample Container

Prep Method

Protocol

200.7

Method

Test **ICP Metals** 

200.7 PREP

Protocol 1

Shealy ID: JB21068-002 Client ID: Filtration Blank Collected: 02/20/2008 at 1045 by EWT

Received: 02/21/2008 0930 by ECC

Entered: 2/21/2008 by CB

Receipt Method: Field Services

Sample Containers:

Qty 1

Test

Sample Containers

Comments

Method

Sample Receiving Matrix: Aqueous

(044) 250 mL P HNO3 (dissolved)

Prep Method

<u>Protocol</u>

Tests:

200.7

Dissolved ICP Metals

200.7 PREP

Protocol 1

Shealy ID: JB21068-003 Client ID: Rec. Stream- Filtered Collected: 02/20/2008 at 1050 by EWT

Sample Receiving Matrix: Aqueous

Received: 02/21/2008 0930 by ECC

Entered: 2/21/2008 by CB

Receipt Method: Field Services

Sample Containers:

Qty 1

Sample Containers (044) 250 mL P HNO3 (dissolved) Comments

Prep Method

Tests:

Method

Dissolved ICP Metals

Totals:

200.7 PREP

**Protocol** Protocol 1

200.7

Sample Containers

Tests/Items

Samples

3

3

(end of report)

# SHEALY Chain of Custody Record

HE, EN' NM AL CONVICE NC.

106 Vantage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111 **Number** 70705

Client SEST		Repor	300	Conta	act	Th	- -	~~~	360	~			Tele	phone	No. /	Fax N	o. / E-	nail						Quo	ote No.	·····
Address		Samp	ler's	Sign	ature		<u>UI</u>	1		,,,,			Waj	/bill No	).					··········				Лен		. 1
City State Zip Co	ode	Samp.  X	dWa	ic.	be	thi	$\supset$	۷	ho	m	P8	on	<b>)</b> —				Analy	sis (Al	tach li	ist if n	nore sp	pace is	s neede	Pag ed.)	ne <u>l</u> of	
Project Name Dewberry / Le	misa	1	- (LE)	<i>,</i> ,,,									<u> </u>				50 L	95/	$\overline{/}$	$\overline{/}$	$\overline{}$	7	$\overline{Z}$	$\overline{//}$	/	<del></del>
Project No.	P.O. No.		rab posite		Mati	rix					ainer ve Ty			ۍ د	<del>)</del>	ESTA!	ONE			/	/	/		40	Lot No.	nX
Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=6 C=Com	Aqueous	Solid	Aqueous	Unpres.	H2SO4	HNO3	HCi	NaOH	SCOC VIII	] .		37/	Dig.					/		<i>-</i>	ر Rema	rks / Coolei	-1.D.
Receiving Stream	2/20/08	1000					2						+	X									2 (	9mil	B. Ma	آلىمۇر
Filtration Blank	2/20/08	1045			_				1		$\downarrow$			ļ	X								2	F: I	er = 0,	45 um
Rec. Stream - Filtered	2/20/08	1050	Щ		_	_			1	$\downarrow$	_			<u> </u>	X								2			
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						$\perp$				4	4	1	<u> </u>	<u> </u>												
							<u> </u>																			
Possible Hazard Identification  ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poisco	n 🗆 Unkn	own				Dispo. n to Ci			Dispo	osal .	by La	ab			Note:						weeks are ma		receipt			
Turn Around Time Required (Prior lab approval required for Standard	expedited TA	Т.)					·	C	QC R	equii	reme	nts (S	pecify	)												
1. Relinquished by 16 hothing 24	mpa	Dat	21	los	2 1	ime	か	1	. Red	ceive	ed by	•									Di	ate		Time		
2. Relinquished by	17 10:0	Dal		100		ime		2	?. Red	ceive	d by										Di	ate		Time		
3. Relinquished by		Dat	te		7	ime		3	3. Lab	orate	ory re	cejve	d by	2n							) Di	je 1/	<u>/</u> '\	Time	192	
Comments								1			ONL on ic		cie) (	res 1	Vo Ic	e Pack			-			eceipt		3.8	<u></u>	
DISTRIBUTION: WHITE & YELLOW-Return to laboratory v	vith Sample(s	s); PINK-Fie	eld/Cli	ient (	Сору								-	<del>-</del>												

Shealy Environmental Services, Inc. Document Number: F-AD-016 Revision Number: 6

Sample Receipt Checklist (SRC)

Page 1 of 1 Replaces Date: 09/22/06 Effective Date: 05/29/07

Client:	SE	SI	Cooler Inspected by/date: <u>CB</u> / <del>02/21/08</del> ot #: <u>TB21066</u>
Means of	receipt:	SESI	Client UPS FedEx Airborne Exp Other
Yes 🔲	No 🗌	NA	1. Were custody seals present on the cooler?
Yes	No 🗌	NA NA	2. If custody seals were present, were they intact and unbroken?
Cooler ID	/temperat	ture upon r	eceipt 3/8 °C/ °C/ °C/ °C/ °C/ °C/ °C
Method o	f coolant:		Blank Against Bottles et Ice Blue Ice Dry Ice None
If respons	se is No (d	or Yes for I	4, 15, 16), an explanation/resolution must be provided.
Yes	No 🗌	NA 🗖	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: (For coolers received via commercial courier, PMs are to be notified immediately.
Yes	No 🗌	NA 🗌	4. Is the commercial courier's packing slip attached to this form?
Yes	No 🗌	NA 🗌	5. Were proper custody procedures (relinquished/received) followed?
Yes 🖊	No 🗌	NA 🗌	6. Were sample IDs listed?
Yes	No 🗌	NA 🗌	7. Was collection date & time listed?
Yes 🖊	No 🗌	NA 🗌	8. Were tests to be performed listed on the COC or was quote # provided?
Yes 🖊	No 🗌	NA 🗌	9. Did all samples arrive in the proper containers for each test?
Yes 🖊	No 🗌	NA 🗌	10. Did all container label information (ID, date, time) agree with COC?
Yes 🖊	No 🗌	NA 🗌	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes	No 🗌	NA 🗌	12. Was adequate sample volume available?
Yes 🗌	No 🗷	NA 🗌	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes	No	NA 🗌	14. Were any samples containers missing?
Yes 🗌	No 🔄	NA 🗌	15. Were there any excess samples not listed on COC?
Yes	No 🗌	NA 🗾	16. Were bubbles present >"pea-size" (1/4" or 6mm in diameter) in any VOA vials?
Yes 🖊	No 🗌	NA 🗍	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes [	No 🗌	NA	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes	No 🗆	NA 🗹	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes 🗌	No	NA	20. Were collection temperatures documented on the COC for NC samples?
	Preservat		st be completed for any sample(s) incorrectly preserved or with headspace.)
Sample(s	s)		were received incorrectly preserved and were adjusted ng with(H <sub>2</sub> SO <sub>4</sub> ,HNO <sub>3</sub> ,HCl,NaOH) with the SR # (number)
Comple/s	-)	<u></u>	were received with bubbles >6 mm in diameter.
Sample(s			were received with TRC > 0.2 mg/L for NH3/
Sample(s		A/pest/PCB	
Toxicity	sample(s)	)	were received with TRC >0.1 mg/L and were
analyzed	by metho	ou 330.3.	
Was clien	t notified: loyee:	taken, if n Yes [	

#### Lot: JB21066

## Sample Receiving Summary

Printed: 02/21/2008 8:22:35 PM by CB

Quote: 11066

Client: (1164) Shealy Environmental Services, Inc. / Beth Thompson

Project Manager: GRW

Comments:

Program Area: SC - NPDES

Comments

Project Name:

PO Number:

Project Number:

Analysis Due: 03/04/2008 Report Due: 03/07/2008 Level 1 Review: Level 2 Review:

Cooler# 1

Temp (°C) 3.8

Shealy ID: JB21066-001 Client ID: Compositor Blank Collected: 02/19/2008 at 1150 by EWT

Cooler ID (if applicable)

Received: 02/21/2008 0932 by ECC Sample Receiving Matrix: Aqueous

> Receipt Method: Field Services Entered: 2/21/2008 by CB

Sample Containers:

Qty

Sample Containers

Comments

Method Test

1

(007) 250 mL P HNO3

Prep Method

Protocol

200.8

ICP-MS Metals no B,Mo,Si,Sn,Ti

200.2

Protocol 1

Shealy ID: JB21066-002 Client ID: Effluent Collected: 02/20/2008 at 1158 by EWT

Sample Receiving Matrix: Aqueous

Received: 02/21/2008 0932 by ECC

Entered: 2/21/2008 by CB

Receipt Method: Field Services

Sample Containers:

Qty

Sample Containers (007) 250 mL P HNO3 Comments

1 1

(033) No Sample Container

Tests:

Tests:

Method

200.8

**Test** 

ICP-MS Metals no B.Mo,Si,Sn,Ti

Prep Method 200.2

**Protocol** Protocol 1

Shealy ID: JB21066-003 Client ID: Filtration Blank Collected: 02/20/2008 at 1205 by EWT

Sample Receiving Matrix: Aqueous

Received: 02/21/2008 0932 by ECC

Entered: 2/21/2008 by CB

Receipt Method: Field Services

Sample Containers:

Qty

Sample Containers

Comments

1

Test

(044) 250 mL P HNO3 (dissolved)

Protocol

Tests: 200.8

Method

Dissolved ICP-MS Metals no B,Mo,Si,Sn,Ti

Prep Method 200.2

Protocol 1

Shealy ID: JB21066-004 Client ID: Filtered Effluent Collected: 02/20/2008 at 1210 by EWT

Sample Receiving Matrix: Aqueous

Received: 02/21/2008 0932 by ECC

Entered: 2/21/2008 by CB

Receipt Method: Field Services

Sample Containers:

Qty Sample Containers Comments

(044) 250 mL P HNO3 (dissolved) 1

**Protocol** 

Tests:

Method

Prep Method

Dissolved ICP-MS Metals no B,Mo,Si,Sn,Ti

200.2

200.8

Protocol 1

Lot: AA00000 (continued)

## Sample Receiving Summary

Printed: 02/21/2008 8:22:35 PM by CB

Client: phClient

Project Name: phProjectName

Project Number: phProjectNumber

Project Manager: phProjectManager

Program Area: phProgramArea

PO Number: phPONumber

Totals:

Samples

Sample Containers 5

Tests/Items

4

(end of report)

WEATHER DATA SUMMARY

FACILITY:

LOUISA, VA WWTP

SAMPLE DATE:

FEB 19-20, 2008

SOURCE:

NATIONAL WEATHER SERVICE LOUISA AIRPORT

Date	Low Temp	High Temp	Avg Temp	Precip	Conditions
	(F)	(F)	(F)	(IN)	
02/05/08	42	78	60	0.01	fog
02/06/08	64	75	70	0.04	rain
02/07/08	41	64	52	0	no significant weather observed
02/08/08	35	55	45	0	no significant weather observed
02/09/08	35	64	50	0	no significant weather observed
02/10/08	37	57	47	0	no significant weather observed
02/11/08	26	37	32	0	no significant weather observed
02/12/08	24	33	28	0.07	no significant weather observed
02/13/08	32	42	37	0.63	rain, snow
02/14/08	21	48	34	0	snow
02/15/08	35	62	48	0	no significant weather observed
02/16/08	35	51	43	0	no significant weather observed
02/17/08	37	51	44	0	no significant weather observed
02/18/08	44	71	58	0.07	rain
02/19/08	33	51	42	0	no significant weather observed
02/20/08	21	37	29	0	snow

## **BEAVER CREEK 02/20/2008**

SAMes say	enen e		AFJow84	WXDxFlox
(Feet)	Decide (Ed)	Feet (V)	7. (B)	(cfs)
BANK	0.00	0.50	0	0.0000
0.5	0.08	0.50	0.40	0.0160
1	0.08	0.50	0.3	0.0120
1.5	0.08	0.50	0.300	0.0120
2	0.17	0.50	0.22	0.0187
2.5	0.17	0.50	0.19	0.0162
3	0.17	0.50	0.2	0.0170
3.5	0.3	0.50	0.21	0.0315
4	0.3	0.50	0.21	0.0315
4.5	0.3	0.50	0.21	0.0315
5	0.4	0.50	0.21	0.0420
5.5	0.3	0.50	0.21	0.0315
6	0.04	0.50	0.21	0.0042
BANK	0	0.50	0	0.0000

TOTAL = 0.2641

0.2641 CFS X 0.65 = 0.172 MGD

## APPENDIX B

Revision number	1411	
EPA WATER BATCH #:	914	
EPA WATER BITTOTAL		DATE: 2/28/08
FINAL TREE DITTE	EXPIRATION	0/15/08
INITIAL USE DATE: 2/19/08	FINAL USE D	ATE: <u>2/25/08</u>
INTERE COLUMN		CIO
STEP 1 DATE: 2/13/08 ANAL	YST INITIALS	i:
STEP I DATE: 2 10	Wall wa	ter conductivity: 2.6 MS
Carboy # Final Volume: 200	yeli wa	
Reagent SESI lot # / Expi	ration Date	Actual Amount Weighed
		(grams)
76.50 Tal-191 /	7.24.08 1	2.00081
MgSO <sub>4</sub> 101-101 / NaHCO <sub>3</sub> T01-243 /	9-20-09 1	9.20071
KCL To1-215 /	4-6-09 (	12.100032
CaSO4*2H2O  701-2127	3 2 2 7	18
MgSO <sub>4</sub> , NaHCO <sub>3</sub> , and KCL are pre-dissolved	d and added to	carboy with aeration.
MgSO <sub>4</sub> , NaHCO <sub>3</sub> , and KCL are pre-dissolved CaSO <sub>4</sub> *2H <sub>2</sub> O in 4liters well water is placed	on stir plate for	24 flours to pre dieses
		0.40
STEP 2 DATE: 4 00 ANAI	YST INITIAL	S:
		170
CaSO <sub>4</sub> *2H <sub>2</sub> O is added to carboy.  Na <sub>2</sub> SeO <sub>4</sub> stock used:	m	Ls added to carboy: 10
Na <sub>2</sub> SeO <sub>4</sub> stock dscd.		
		. 1100
STEP 3 DATE: 2/18/09 ANA	LYST INITIA	LS:CAVY
STEP 3 DATE.		Approximate Range
Analysis	Result	Аррголими
Fig. 1 Conductivity (US)	293	
Final Conductivity (µs) Final pH (su)	7.46	7.4-7.8
Hardness (mg/l): by hand titration	80	80-100
Hardness (mg/l): analytical lab	90	57-64
Alkalinity (mg/l): analytical lab	<u> </u>	

COMMENTS/ NOTES:



Page 1 of 2

## SHEALY ENVIRONMENTAL SERVICES, INC.

## COPPER WATER-EFFECT RATIO STUDY / BIOASSAY DATA FORM

FACILITY: LOUISA REGIONAL STP	TEST: LAB WATER TEST
LAB DILUTION WATER ID: EPA 914	
HARDNESS: 88 mg/L	
SUBSTOCK: 4 mg CuSO <sub>4</sub> *5H <sub>2</sub> O / liter EPA 914	

Test Species: Ceriodaphnia dubia	<b>Test Start Date/Time:</b> 02/21/2008 1600
Age: <24 hours	Analyst Initials @ Start: CAD
Source/Neonate ID: B3248	24 hour Reading Time: 02/22/2008 1515
Incubator #: 4	Analyst Initials @ 24 hours: CAD
Board #: ss	Test End Date/Time: 02/23/2008 1615
Thermometer #: 7235	Analyst Initials @ End: EWT

## WATER CHEMISTRY DATA

Treatment	Temp.	D.O.	pН	Temp.	D.O.	pН	Temp.	D.O.	pН
%	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)
Substock	0 Hrs.	0 Hrs.	0 Hrs.	24 Hrs.	24 Hrs.	24 Hrs.	48 Hrs.	48 Hrs.	48 Hrs.
0 (Lab Control)	24.0	8.03	7.89	24.1	6.80	7.86	24.5	8.46	7.93
0.25	24.0	8.07	7.97	24.1	6.82	8.13	24.5	8.43	7.96
0.39	24.1	8.09	8.03	24.1	6.81	8.09	24.4	8.43	7.96
0.60	24.1	8.10	8.02	24.1	6.81	8.06	24.5	8.41	8.02
0.91	24.0	8.10	8.00	24.1	6.81	8.04	24.2	8.41	8.01
1.4	24.0	8.06	7.99	24.1	6.79	8.03	24.4	8.42	7.99
2.1	24.1	8.04	7.99	24.0	6.75	8.02	24.7	8.44	8.01

Surrogate cups contain \_\_5\_\_ organisms at test initiation.

### RESULTS

TOTAL COPPER LC50 =  $8.290 \mu g/L$ 

DISSOLVED COPPER LC50= 8.090 µg/L

Page 2 of 2

## MORTALITY DATA: LOUISA REGIONAL STP / LABWATER TEST (02/21/2008)

Concentration %	Measured μg/L Copper	Rep.	# Dead 24 Hours	# Dead 48 Hours	% Mortality 48 Hours	Final μg/L Copper
Substock	(Tot. / Diss.)					(Dissolved)
0	<1.0 / <1.0	Α	0	0	0%	<1.0
( Lab Control)		В	0	0		
		С	0	0		
		D	0	0		
0.25%	2.5 / 2.4	A	0	0	0%	*
		В	0	0		
		С	0	0		
		D	0	0		
0.39%	3.6 / 3.7	A	0	0	0%	*
		В	0	0		
		С	0	0		
		D	0	0		
0.6%	6.0 / 5.8	Α	0	0	0%	4.8
		В	0	0		
		С	0	0		
		D	0	0		
0.91%	9.3 / 9.1	Α	2	2	80%	13
-		В	5	5		
		С	5	5		
		D	1	4		
1.4%	17 / 17	A	5	5	100%	14
		В	5	5		
		С	5	5		
		D	5	5		
2.1%	24 / 24	A	5	5	100%	*
		В	5	5	1	
		С	5	5		
·		D	5	5		

<sup>\*</sup>Final dissolved copper measurement is not required for this concentration.

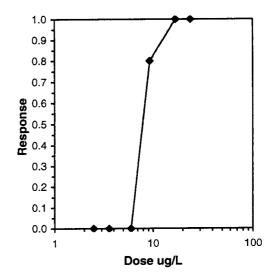
					V	
				Daphnid Acute	Test-48 Hr Survival	
Start Date:	02/21/08		Test ID:	LRLWTOTCU3	Sample ID:	
End Date:	02/23/08		Lab ID:		Sample Type:	
Sample Date:	02/20/08		Protocol:	EPAAW02-EPA/821/	R-02-01 Test Species:	CD-Ceriodaphnia dubia
Comments:						
Conc-ug/L	1	2	3	4		
D-Control	1.0000	1.0000	1.0000	1.0000		
2.5	1.0000	1.0000	1.0000	1.0000		
3.6	1.0000	1.0000	1.0000	1.0000		
6	1.0000	1.0000	1.0000	1.0000		
9.3	0.6000	0.0000	0.0000	0.2000		
17	0.0000	0.0000	0.0000	0.0000		
24	0.0000	0.0000	0.0000	0.0000		

Transform: Arcsin Square Root						Number	Total		
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
2.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
3.6	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
6	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
9.3 ⊬	0.2000	0.2000	0.4502	0.2255	0.8861	69.198	4	16	20
17 -	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
24 -	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.52023	0.868	1.85413	9.13553
Equality of variance cannot be confirmed				

Trimmed	S	pearman-Karber	

Trim Level	EC50	95%	CL	
0.0%	8.2899	7.5525	9.0992	
5.0%	8.1378	7.3640	8.9930	
10.0%	8.0132	7.2482	8.8590	
20.0%	7.8906	7.4218	8.3890	
Auto-0.0%	8.2899	7.5525	9.0992	



				Daphnid Acute	e Test-48 Hr Survival	
Start Date:	02/21/08		Test ID:	LRLWDISCU3	Sample ID:	
End Date:	02/23/08		Lab ID:		Sample Type:	
Sample Date:	02/20/08		Protocol:	EPAAW02-EPA/821/	R-02-01 Test Species:	CD-Ceriodaphnia dubia
Comments:						
Conc-ug/L	1	2	3	4		
D-Control	1.0000	1.0000	1.0000	1.0000		
2.4	1.0000	1.0000	1.0000	1.0000		
3.7	1.0000	1.0000	1.0000	1.0000		
5.8	1.0000	1.0000	1.0000	1.0000		
9.1	0.6000	0.0000	0.0000	0.2000		
17	0.0000	0.0000	0.0000	0.0000		
24	0.0000	0.0000	0.0000	0.0000		

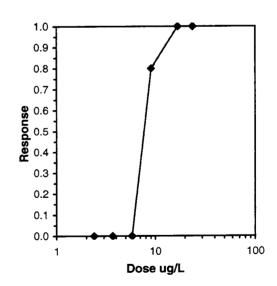
		<del></del>	Number	Total					
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
2.4~	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
3.7 -	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
5.8 ~	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
9.1	0.2000	0.2000	0.4502	0.2255	0.8861	69.198	4	16	20
17~	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
24 ~	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests	Statistic	Critical	Skew Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.52023	0.868	1.85413 9.13553
Equality of variance cannot be confirmed			

Trimmed Spearman-Karber

95% CL **Trim Level** EC50 8.0898 7.3479 8.9065 0.0% 5.0% 7.9358 7.1580 8.7982

10.0% 7.8098 7.0416 8.6618 7.6858 7.2169 8.1851 20.0% Auto-0.0% 8.0898 7.3479 8.9065





Page 1 of 2

## SHEALY ENVIRONMENTAL SERVICES, INC.

#### COPPER WATER-EFFECT RATIO STUDY / BIOASSAY DATA FORM

FACILITY: LOUISA REGIONAL STP TEST: SIMULATED STREAM

**EFFLUENT ID:** JB21066 COLLECTED 02/19/2008 1200 TO 02/20/2008 1158

SIMULATED STREAM ID: 99.6% Effluent / 0.4% Beaver Creek

LAB DILUTION WATER ID: EPA 914

HARDNESS OF SIMSTREAM: 57 mg/L

SUBSTOCK: 4 mg CuSO<sub>4</sub>\*5H<sub>2</sub>O / liter Simulated Stream water

Test Species: Ceriodaphnia dubia	Test Start Date/Time: 02/21/2008 1600
Age: <24 hours	Analyst Initials @ Start: CAD
Source/Neonate ID: B3248	24 hour Reading Time: 02/22/2008 1515
Incubator #: 4	Analyst Initials @ 24 hours: CAD
Board #: ss	Test End Date/Time: 02/23/2008 1615
Thermometer #: 7235	Analyst Initials @ End: EWT

WATER CHEMISTRY DATA

Treatment	Temp	D.O.	pН	Temp.	D.O.	pН	Temp.	D.O.	pН
%	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)
Substock	0 Hrs.	0 Hrs.	0 Hrs.	24 Hrs.	24 Hrs.	24 Hrs.	48 Hrs.	48 Hrs.	48 Hrs.
0 (Lab Control)	24.0	8.00	7.98	24.1	6.67	8.01	24.5	8.40	7.94
Receiving Stream	24.0	7.97	8.11	24.0	6.68	8.12	24.4	8.41	8.00
Simstream	24.0	8.04	7.87	24.1	6.70	7.92	24.4	8.42	7.84
3.2	24.1	8.03	7.84	24.1	6.69	7.88	24.5	8.45	7.84
4.9	24.1	8.04	7.81	24.0	6.66	7.86	24.7	8.45	7.84
7.5	24.1	8.02	7.79	24.1	6.65	7.84	24.5	8.51	7.84
11.6	24.0	8.00	7.76	24.1	6.63	7.81	24.4	8.46	7.85
17.9	24.0	7.96	7.74	24.1	6.62	7.80	24.6	8.45	7.83
27.5	24.0	7.92	7.72	24.0	6.60	7.79	24.5	8.42	7.83
42.3	24.1	7.96	7.71	24.1	6.56	7.79	24.5	8.41	7.84

Surrogate cups contain 5 organisms at test initiation.

#### RESULTS

TOTAL COPPER LC50 =  $239.3 \mu g/L$ 

DISSOLVED COPPER LC50= 182.5 μg/L



Page 2 of 2

## MORTALITY DATA: LOUISA REGIONAL STP / SIMSTREAM TEST (02/21/2008)

Concentration % Substock	Concentration  µg/L Copper  (Tot. / Diss.)	Rep.	# Dead 24 Hours	# Dead 48 Hours	% Mortality 48 Hours	Final  µg/L Copper  (Dissolved)
0	<1.0 / <1.0	A	0	0	0%	<1.0
(Lab Control)	~1.0 / ~1.0	В	0	0	070	1.0
(Lab Control)		С	0	0		
		D	0	0		
Receiving Stream	1.77/0.4				0%	1.4
Receiving Stream	1.7 / 2.4	A	0	0	0%	1.4
		В	0	0	٠	
		C	0	0		
		D	0		00/	0.5
Simstream	15 / 7.8	<u>A</u>	0	0	0%	8.7
		В	0	0		
		C	0	0		
		D	0	0		
3.2%	53 / 40	A	0	0	0%	*
		В	0	0		
		С	0	0	·	
		D -	0	0		
4.9%	67 / 52	Α	0	0	0%	*
		В	0	0		
		С	0	0		
		D	0	0		
7.5%	100 / 75	A	0	0	0%	*
:		В	0	0		:
		С	0	0		
		D	0	0		
11.6%	140 / 110	A	0	0	0%	100
		В	0	0		
		С	0	0		
		D	0	0		
17.9%	200 / 150	A	0	1	10%	150
		В	0	0		
	·	C	0	0		
		D	0	1		ŀ
27.5%	310 / 240	A	5	5	100%	230
41.570	510 / 270	В	5	5	100/0	250
		C	. 5	5		
		D	5	5		
42.3%	470 / 360		5	5	100%	*
42.370	4/0/300	A B	5	5	10070	
		С	5	5		
		D	5	5		

<sup>\*</sup>Final dissolved copper measurement is not required for this concentration.

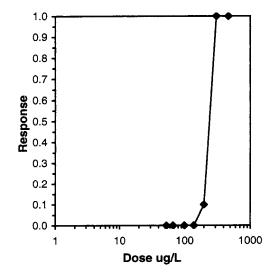
-247				Daphnid Acu	te Test-48 Hr Survival	
Start Date:	02/21/08		Test ID:	LRSSTOTCU3	Sample ID:	
End Date:	02/23/08		Lab ID:	<del></del>	Sample Type:	
Sample Date:	02/20/08		Protocol:	EPAAW02-EPA/821	/R-02-01 Test Species:	CD-Ceriodaphnia dubia
Comments:						
Conc-ug/L	1	2	3	4		
D-Control	1.0000	1.0000	1.0000	1.0000		
53	1.0000	1.0000	1.0000	1.0000		
67	1.0000	1.0000	1.0000	1.0000		
100	1.0000	1.0000	1.0000	1.0000		
140	1.0000	1.0000	1.0000	1.0000		
200	0.8000	1.0000	1.0000	0.8000		
310	0.0000	0.0000	0.0000	0.0000		
470	0.0000	0.0000	0.0000	0.0000		

			Tra	ansform:	Arcsin Sc	quare Root		Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp I	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
53 ∽	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
67 ·	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
100	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
140×	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
200⊬	0.9000	0.9000	1.2262	1.1071	1.3453	11.212	4	2	20
310-	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
470 -	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)
Equality of variance cannot be confirmed Statistic 0.57623 Critical Skew Kurt 0.884 6.6E-15 4.03247

## Trimmed Spearman-Karber

Trim Level	EC50	95%	CL	
0.0%	239.30	226.87	252.40	
5.0%	241.97	226.56	258.43	
10.0%	243.01	234.35	251.99	
20.0%	243.01	234.35	251.99	
Auto-0.0%	239.30	226.87	252.40	



				Daphnid Acute	Test-48 Hr Survival	
Start Date:	02/21/08		Test ID:	LRSSDISCU3	Sample ID:	
End Date:	02/23/08		Lab ID:		Sample Type:	
Sample Date:	02/20/08		Protocol:	EPAAW02-EPA/821/F	R-02-01 Test Species:	CD-Ceriodaphnia dubia
Comments:						
Conc-ug/L	1	2	3	4		
D-Control	1.0000	1.0000	1.0000	1.0000	-	
40	1.0000	1.0000	1.0000	1.0000		
52	1.0000	1.0000	1.0000	1.0000		
75	1.0000	1.0000	1.0000	1.0000		
110	1.0000	1.0000	1.0000	1.0000		
150	0.8000	1.0000	1.0000	0.8000		
240	0.0000	0.0000	0.0000	0.0000		
360	0.0000	0.0000	0.0000	0.0000		

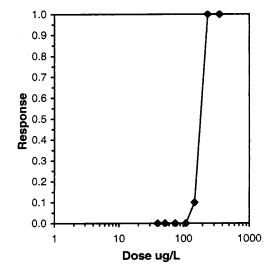
			Tra	ansform:	Arcsin Sc	uare Roo		Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
40 -	<b>1.0000</b>	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
52 ∽	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
75 ~	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
110~	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
150∽	0.9000	0.9000	1.2262	1.1071	1.3453	11.212	4	2	20
240~	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
360∕	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests	Statistic	Critical	Skew Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.57623	0.884	6.6E-15 4.03247
E. although an almost his confirmed			

Equality of variance cannot be confirmed

## Trimmed Spearman-Karber

Trim Level	EC50	95%	CL	
0.0%	182.48	173.17	192.28	
5.0%	184.19	172.80	196.32	
10.0%	184.85	177.79	192.18	
20.0%	184.85	177.79	192.18	
Auto-0.0%	182.48	173.17	192.28	



# **APPENDIX C**

#### Report of Analysis

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Project Name: Dewberry/Louisa

Total and dissolved metal scans for effluent Compositor and Dissolved metal filtration blanks

Date Completed:02/28/2008

**Grant Wilton** 

Acond 1 Willem

**Project Manager** 



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



SC DHEC No: 32010 NELAC No: E87653 NC DEHNR No: 329

# Case Narrative Shealy Environmental Services, Inc.

Lot Number: JB21066

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 2 of 8

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB21066

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Compositor Blank	Aqueous	02/19/2008 1150	02/21/2008
002	Effluent	Aqueous	02/20/2008 1158	02/21/2008
003	Filtration Blank	Aqueous	02/20/2008 1205	02/21/2008
004	Filtered Effluent	Aqueous	02/20/2008 1210	02/21/2008

(4 samples)

# Executive Summary Shealy Environmental Services, Inc.

Lot Number: JB21066

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Compositor Blank	Aqueous	Manganese	200.8	13		ug/L	5
002	Effluent	Aqueous	Aluminum	200.8	150		ug/L	6
002	Effluent	Aqueous	Cadmium	200.8	0.26		ug/L	6
002	Effluent	Aqueous	Calcium	200.8	17000		ug/L	6
002	Effluent	Aqueous	Copper	200.8	17		ug/L	6
002	Effluent	Aqueous	Iron	200.8	160		ug/L	6
002	Effluent	Aqueous	Magnesium	200.8	3100		ug/L	6
002	Effluent	Aqueous	Manganese	200.8	14		ug/L	6
002	Effluent	Aqueous	Potassium	200.8	20000		ug/L	6
002	Effluent	Aqueous	Sodium	200.8	32000		ug/L	6
002	Effluent	Aqueous	Zinc	200.8	100		ug/L	6
004	Filtered Effluent	Aqueous	Dissolved Cadmium	200.8	0.21		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Calcium	200.8	17000		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Copper	200.8	7.0		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Iron	200.8	56		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Magnesium	200.8	3200		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Potassium	200.8	20000		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Sodium	200.8	31000		ug/L	8
004	Filtered Effluent	Aqueous	Dissolved Zinc	200.8	86		ug/L	8

(19 detections)

Description: Compositor Blank Date Sampled:02/19/2008 1150

Laboratory ID: JB21066-001

Matrix: Aqueous

Date Received: 02/21/2008

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/26/2008 0319	FTS	02/22/2008 1630	73801
2	200.2	200.8	1	02/26/2008 2149	FTS	02/22/2008 1630	73801
3	200.2	200.8	1	02/27/2008 2021	FTS	02/22/2008 1630	73801

	CAS	Analytical				_
Parameter	Number	Method	Result	Q PQL	Units	Run
Aluminum	7429-90-5	200.8	ND	50	ug/L	3
Antimony	7440-36-0	200.8	ND	5.0	ug/L	1
Arsenic	7440-38-2	200.8	ND	5.0	ug/L	1
Barium	7440-39-3	200.8	ND	25	ug/L	1
Beryllium	7440-41-7	200.8	ND	1.0	ug/L	3
Cadmium	7440-43-9	200.8	ND	0.10	ug/L	1
Calcium	7440-70-2	200.8	ND	5000	ug/L	1
Chromium	7440-47-3	200.8	ND	5.0	ug/L	1
Cobalt	7440-48-4	200.8	ND	5.0	ug/L	2
Copper	7440-50-8	200.8	ND	5.0	ug/L	1
ron	7439-89-6	200.8	ND	20	ug/L	3
Lead	7439-92-1	200.8	ND	2.0	ug/L	1
Magnesium	7439-95-4	200.8	ND	50	ug/L	1
Manganese	7439-96-5	200.8	13	10	ug/L	2
Nickel	7440-02-0	200.8	ND	10	ug/L	2
Potassium	7440-09-7	200.8	ND	5000	ug/L	1
Selenium	7782-49-2	200.8	ND	5.0	ug/L	1
Silver	7440-22-4	200.8	ND	5.0	ug/L	1
Sodium	7440-23-5	200.8	ND	5000	ug/L	1
Thallium	7440-28-0	200.8	ND	0.50	ug/L	1
√anadium	7440-62-2	200.8	ND	50	ug/L	2
Zinc	7440-66-6	200.8	ND	10	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Description: Effluent Date Sampled:02/20/2008 1158 Date Received: 02/21/2008

Laboratory ID: JB21066-002

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/26/2008 0328	FTS	02/22/2008 1630	73801
2	200.2	200.8	1	02/26/2008 2158	FTS	02/22/2008 1630	73801
3	200.2	200.8	1	02/27/2008 2030	FTS	02/22/2008 1630	73801

	CAS	Analytical			_1		_
Parameter	Number	Method	Result	Q	PQL	Units	Run
Aluminum	7429-90-5	200.8	150		50	ug/L	3
Antimony	7440-36-0	200.8	ND		5.0	ug/L	1
Arsenic	7440-38-2	200.8	ND		5.0	ug/L	1
Barium	7440-39-3	200.8	ND		25	ug/L	1
Beryllium	7440-41-7	200.8	ND		1.0	ug/L	3
Cadmium	7440-43-9	200.8	0.26		0.10	ug/L	1
Całcium	7440-70-2	200.8	17000		5000	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	ug/L	2
Copper	7440-50-8	200.8	17		5.0	ug/L	1
Iron	7439-89-6	200.8	160		20	ug/L	2
Lead	7439-92-1	200.8	ND		2.0	ug/L	1
Magnesium	7439-95-4	200.8	3100		50	ug/L	1
Manganese	7439-96-5	200.8	14		10	ug/L	2
Nickel	7440-02-0	200.8	ND		10	ug/L	1
Potassium	7440-09-7	200.8	20000		5000	ug/L	1
Selenium	7782-49-2	200.8	ND		5.0	ug/L	1
Silver	7440-22-4	200.8	ND		5.0	ug/L	1
Sodium	7440-23-5	200.8	32000		5000	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Vanadium	7440-62-2	200.8	ND		50	ug/L	2
Zinc	7440-66-6	200.8	100		10	ug/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Description: Filtration Blank
Date Sampled:02/20/2008 1205
Date Received: 02/21/2008

Laboratory ID: JB21066-003

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	<b>Analysis Date</b>	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/26/2008 0338	FTS	02/22/2008 1630	73801
2	200.2	200.8	1	02/26/2008 2207	FTS	02/22/2008 1630	73801
3	200.2	200.8	1	02/27/2008 2039	FTS	02/22/2008 1630	73801

	CAS	Analytical					_
Parameter	Number	Method	Result	Q	PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.8	ND		50	ug/L	3
Dissolved Antimony	7440-36-0	200.8	ND		5.0	ug/L	1
Dissolved Arsenic	7440-38-2	200.8	ND		5.0	ug/L	1
Dissolved Barium	7440-39-3	200.8	ND		25	ug/L	1
Dissolved Beryllium	7440-41-7	200.8	ND		1.0	ug/L	3
Dissolved Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Dissolved Calcium	7440-70-2	200.8	ND		5000	ug/L	1
Dissolved Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Dissolved Cobalt	7440-48-4	200.8	ND		5.0	ug/L	2
Dissolved Copper	7440-50-8	200.8	ND		5.0	ug/L	1
Dissolved Iron	7439-89-6	200.8	ND		20	ug/L	3
Dissolved Lead	7439-92-1	200.8	ND		2.0	ug/L	1
Dissolved Magnesium	7439-95-4	200.8	ND		50	ug/L	1
Dissolved Manganese	7439-96-5	200.8	ND		10	ug/L	2
Dissolved Nickel	7440-02-0	200.8	ND		10	ug/L	1
Dissolved Potassium	7440-09-7	200.8	ND		5000	ug/L	1
Dissolved Selenium	7782-49-2	200.8	ND		5.0	ug/L	1
Dissolved Silver	7440-22-4	200.8	ND		5.0	ug/L	1
Dissolved Sodium	7440-23-5	200.8	ND		5000	ug/L	1
Dissolved Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Dissolved Vanadium	7440-62-2	200.8	ND		50	ug/L	2
Dissolved Zinc	7440-66-6	200.8	ND		10	ug/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Description: Filtered Effluent
Date Sampled:02/20/2008 1210

Date Received: 02/21/2008

Laboratory ID: JB21066-004

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/26/2008 0347	FTS	02/22/2008 1630	73801
2	200.2	200.8	1	02/26/2008 2216	FTS	02/22/2008 1630	73801

	CAS	Analytical			ll mkm	Run
Parameter	Number	Method	Result	Q PQ	L Units	Run
Dissolved Aluminum	7429-90-5	200.8	ND	;	50 ug/L	2
Dissolved Antimony	7440-36-0	200.8	ND	5	.0 ug/L	1
Dissolved Arsenic	7440-38-2	200.8	ND	5	.0 ug/L	1
Dissolved Barium	7440-39-3	200.8	ND	:	25 ug/L	1
Dissolved Beryllium	7440-41-7	200.8	ND	1	.0 ug/L	2
Dissolved Cadmium	7440-43- <del>9</del>	200.8	0.21	0.1	IO ug/L	1
Dissolved Calcium	7440-70-2	200.8	17000	50	00 ug/L	1
Dissolved Chromium	7440-47-3	200.8	ND	5	.0 ug/L	1
Dissolved Cobalt	7440-48-4	200.8	ND	5	.0 ug/L	2
Dissolved Copper	7440-50-8	200.8	7.0	5	.0 ug/L	1
Dissolved Iron	7439-89-6	200.8	56	:	20 ug/L	2
Dissolved Lead	7439-92-1	200.8	ND	2	.0 ug/L	1
Dissolved Magnesium	7439-95-4	200.8	3200	;	50 ug/L	1
Dissolved Manganese	7439-96-5	200.8	ND		10 ug/L	2
Dissolved Nickel	7440-02-0	200.8	ND		10 ug/L	1
Dissolved Potassium	7440-09-7	200.8	20000	50	00 ug/L	1
Dissolved Selenium	7782-49-2	200.8	ND	5	.0 ug/L	1
Dissolved Silver	7440-22-4	200.8	ND	5	.0 ug/L	1
Dissolved Sodium	7440-23-5	200.8	31000	50	)0 ug/L	1
Dissolved Thallium	7440-28-0	200.8	ND	0.:	50 ug/L	1
Dissolved Vanadium	7440-62-2	200.8	ND	;	50 ug/L	2
Dissolved Zinc	7440-66-6	200.8	86		10 ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

### CWA / NPDES Chain of Custody Record

#### SHEALY ENVIRONMENTAL SERVICES, INC.

106 Vantage Point Drive • West Columbia, SC 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111 www.shealylab.com

Number 07319

SHEALY ENVIRONMENTAL

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DISTRIBUTION: WHITE & YELLOW Return to Integratory with Sample(a): PINK-Field/Client Copy

Document Number: F-AD (3)1 Effective Date: 3-01-06

Suesty Environmental Services, Inc. Document Number F-AD-016 Revision Number 6 Page 1 of 1 Reptaces Date: 09/22/06 Effective Date: 05/29/07

Sample Receipt Checklist (SRC)

leans of receipt: SESI	☐ Client ☐ UPS ☐ FedEx ☐ Airborne Exp ☐ Other
es No NA	1. Were custody seals present on the cooler?
es No NA	2. If custody seals were present, were they intact and unbroken?
ooler ID/temperature upon t	
come instantabasamic alsons	1 °C / °C / °C
fethod: Z Temperature:	
Method of coolant: Z W	
	14, 15, 16), an explanation/resolution must be provided.
	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified?
res 🔲 No 🖂 NA	PM notified by SRC, phone, note (circle one), other: (For
	coolers received via commercial courier, PMs are to be notified immediately.
(es No NA NA	4. Is the commercial courier's packing slip attached to this form?
es No NA	5. Were proper custody procedures (relinquished/received) followed?
es No NA	6. Were sample IDs listed?
es Z No NA	7. Was collection date & time listed?
es 🗾 No 🗌 NA 🗌	8. Were tests to be performed listed on the COC or was quote # provided?
cs No NA	Did all samples arrive in the proper containers for each test?
es No NA	10. Did all container label information (ID, date, time) agree with COC?
cs No NA	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
es No NA	12. Was adequate sample volume available?
es No 2 NA	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
cs No No	14. Were any samples containers missing?
es No NA	15. Were there any excess samples not listed on COC?
es No Na Z	16. Were bubbles present >"pea-size" (%"or 6mm in diameter) in any VOA vials?
Yes 🗷 No 🗌 NA 🗍	17. Were all metals/0&G/HEM/nutrient samples received at a pH of <2?
es No Na	18. Were all cyanide and/or sulfide samples received at a pH >127
es No Na Na	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb
cs No No NA	(<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
es No NA	20. Were collection temperatures documented on the COC for NC samples?
ample Preservation (Mu	st be completed for any sample(s) incorrectly preserved or with headspace.)
	were received incorrectly preserved and were adjusted
ample(s)	
Sample(s) scowdingly in sample receivi	
ecordingly in sample receiving	ing with (H <sub>2</sub> SO <sub>4</sub> ,HNO <sub>5</sub> ,HCl,NaOH) with the SR # (number)
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coordingly in sample receive ample(s)	were received with bubbles >6 mm in diameter.  were received with TRC >0.2 mg/L for NH3/

#### Report of Analysis

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Lot Number: JB21063 Date Completed: Preliminary

Initial Water Characterization

**Grant Wilton Project Manager** 

Acond 1 Willen



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



SC DHEC No: 32010 NELAC No: E87653 NC DEHNR No: 329

### **Case Narrative** Shealy Environmental Services, Inc.

Lot Number: JB21063

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB21063

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Labwater	Aqueous	02/21/2008 1200	02/21/2008
002	Simstream	Aqueous	02/21/2008 1221	02/21/2008
003	Effluent	Aqueous	02/20/2008 1200	02/21/2008
004	Rec. Stream	Aqueous	02/20/2008 1000	02/21/2008

(4 samples)

### **Executive Summary** Shealy Environmental Services, Inc.

Lot Number: JB21063

Sample	Sample ID	Matrix	Parameter	Method	Result (	Q Units	Page
001	Labwater	Aqueous	Alkalinity	310.1	62	mg/L	5
001	Labwater	Aqueous	Hardness (total)	130.2	88	mg/L	5
001	Labwater	Aqueous	Specific Conductance	120.1	287	umhos/cm	5
001	Labwater	Aqueous	Dissolved Calcium	200.7	14	mg/L	6
001	Labwater	Aqueous	Dissolved Magnesium	200.7	12	mg/L	6
001	Labwater	Aqueous	Dissolved Sodium	200.7	27	mg/L	6
001	Labwater	Aqueous	Calcium	200.7	14	mg/L	7
001	Labwater	Aqueous	Magnesium	200.7	12	mg/L	7
001	Labwater	Aqueous	Sodium	200.7	26	mg/L	7
002	Simstream	Aqueous	Alkalinity	310.1	81	mg/L	8
002	Simstream	Aqueous	Hardness (total)	130.2	57	mg/L	8
002	Simstream	Aqueous	Specific Conductance	120.1	322	umhos/cm	8
002	Simstream	Aqueous	TOC	415.1	9.9	mg/L	8
002	Simstream	Aqueous	TSS	160.2	6.9	mg/L	8
002	Simstream	Aqueous	Dissolved Calcium	200.7	16	mg/L	9
002	Simstream	Aqueous	Dissolved Copper	200.7	0.0088	mg/L	9
002	Simstream	Aqueous	Dissolved Potassium	200.7	9.6	mg/L	9
002	Simstream	Aqueous	Dissolved Sodium	200.7	48	mg/L	9
002	Simstream	Aqueous	Dissolved Zinc	200.7	0.092	mg/L	9
002	Simstream	Aqueous	Aluminum	200.7	0.22	mg/L	10
002	Simstream	Aqueous	Calcium	200.7	16	mg/L	10
002	Simstream	Aqueous	Copper	200.7	0.014	mg/L	10
002	Simstream	Aqueous	Iron	200.7	0.12	mg/L	10
002	Simstream	Aqueous	Potassium	200.7	9.9	mg/L	10
002	Simstream	Aqueous	Sodium	200.7	45	mg/L	10
002	Simstream	Aqueous	Zinc	200.7	0.097	mg/L	10
003	Effluent	Aqueous	Alkalinity	310.1	40	mg/L	11
003	Effluent	Aqueous	Ammonia - N (phenate)	350.1	0.28	mg/L	11
003	Effluent	Aqueous	Hardness (total)	130.2	57	mg/L	11
003	Effluent	Aqueous	Specific Conductance	120.1	384	umhos/cm	11
003	Effluent	Aqueous	TOC	415.1	9.5	mg/L	11
003	Effluent	Aqueous	TSS	160.2	10	mg/L	11
004	Rec. Stream	Aqueous	Alkalinity	310.1	26	mg/L	12
004	Rec. Stream	Aqueous	Hardness (total)	130.2	35	mg/L	12
004	Rec. Stream	Aqueous	Specific Conductance	120.1	105	umhos/cm	12
004	Rec. Stream	Aqueous	TOC	415.1	4.3	mg/L	12

(36 detections)

### Inorganic non-metals

Client: Shealy Environmental Services, Inc.

Description: Labwater

Date Sampled:02/21/2008 1200

Date Received: 02/21/2008

Laboratory ID: JB21063-001

Matrix: Aqueous

Run 1	Prep Method	Analytical Method (Alkalinity) 310.1	Dilution 1	<b>Analysis Date</b> 02/26/2008 0113	Analyst IVC	Prep Date	<b>Batch</b> 73963
1	350.2	(Ammonia - N ) 350.1	1	02/29/2008 1459	WD	02/28/2008 1902	74190
1		(DOC) 415.1	1				
1		(Hardness (to) 130.2	1	02/27/2008 1802	IVC		74140
1		(Specific Con) 120.1	1	02/26/2008 0102	IVC		73969
1		(TOC) 415.1	1	03/02/2008 1954	PBC		74401
1		(TSS) 160.2	1	02/25/2008 1618	PMM		73893

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		310.1	62		10	mg/L	1
Ammonia - N (phenate)		350.1	ND		0.10	mg/L	1
DOC		415.1	Pending		1.0	mg/L	1
Hardness (total)		130.2	88		10	mg/L	1
Specific Conductance		120.1	287		2.00	umhos/cm	1
TOC		415.1	ND		1.0	mg/L	1
TSS		160.2	ND		4.0	mg/L	1

PQL = Practical quantitation limit
ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Labwater

Date Sampled:02/21/2008 1200 Date Received: 02/21/2008

Laboratory ID: JB21063-001

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 2003	KJC	02/22/2008 1320	73758
2	200.7	200.7	1	02/27/2008 1428	MNM	02/22/2008 1320	73758
3	200.7	200.7	1	03/03/2008 1832	MNM	03/02/2008 1518	74337

	CAS	Analytical				_
Parameter	Number	Method	Result	Q PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.7	ND	0.20	mg/L	1
Dissolved Antimony	7440-36-0	200.7	ND	0.010	mg/L	2
Dissolved Arsenic	7440-38-2	200.7	ND	0.010	mg/L	1
Dissolved Barium	7440-39-3	200.7	ND	0.025	mg/L	1
Dissolved Beryllium	7440-41-7	200.7	ND	0.0040	mg/L	1
Dissolved Cadmium	7440-43-9	200.7	ND	0.0020	mg/L	1
Dissolved Calcium	7440-70-2	200.7	14	5.0	mg/L	1
Dissolved Chromium	7440-47-3	200.7	ND	0.0050	mg/L	1
Dissolved Cobalt	7440-48-4	200.7	ND	0.025	mg/L	1
Dissolved Copper	7440-50-8	200.7	ND	0.0050	mg/L	1
Dissolved Iron	7439-89-6	200.7	ND	0.10	mg/L	1
Dissolved Lead	7439-92-1	200.7	ND	0.010	mg/L	1
Dissolved Magnesium	7439-95-4	200.7	12	5.0	mg/L	1
Dissolved Manganese	7439-96-5	200.7	ND	0.015	mg/L	1
Dissolved Nickel	7440-02-0	200.7	ND	0.040	mg/L	1
Dissolved Potassium	7440-09-7	200.7	ND	5.0	mg/L	1
Dissolved Selenium	7782-49-2	200.7	ND	0.010	mg/L	1
Dissolved Silver	7440-22-4	200.7	ND	0.0050	mg/L	1
Dissolved Sodium	7440-23-5	200.7	27	5.0	mg/L	3
Dissolved Thallium	7440-28-0	200.7	ND	0.050	mg/L	1
Dissolved Vanadium	7440-62-2	200.7	ND	0.050	mg/L	1
Dissolved Zinc	7440-66-6	200.7	ND	0.020	mg/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank

J = Estimated result < PQL and > MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Labwater Date Sampled:02/21/2008 1200 Date Received: 02/21/2008

Laboratory ID: JB21063-001

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	,1	02/25/2008 1956	KJC	02/22/2008 1320	73758
2	200.7	200.7	1	02/27/2008 1421	MNM	02/22/2008 1320	73758
3	200.7	200.7	1	03/03/2008 1827	MNM	03/02/2008 1518	74337

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Aluminum	7429-90-5	200.7	ND		0.20	mg/L	1
Antimony	7440-36-0	200.7	ND		0.010	mg/L	2
Arsenic	7440-38-2	200.7	ND		0.010	mg/L	1
Barium	7440-39-3	200.7	ND		0.025	mg/L	1
Beryllium	7440-41-7	200.7	ND	(	0.0040	mg/L	1
Cadmium	7440-43-9	200.7	ND	(	0.0020	mg/L	1
Calcium	7440-70-2	200.7	14		5.0	mg/L	1
Chromium	7440-47-3	200.7	ND	(	0.0050	mg/L	1
Cobalt	7440-48-4	200.7	ND		0.025	mg/L	1
Copper	7440-50-8	200.7	ND	(	0.0050	mg/L	1
Iron	7439-89-6	200.7	ND		0.10	mg/L	1
Lead	7439-92-1	200.7	ND		0.010	mg/L	1
Magnesium	7439-95-4	200.7	12		5.0	mg/L	1
Manganese	7439-96-5	200.7	ND		0.015	mg/L	1
Nickel	7440-02-0	200.7	ND		0.040	mg/L	1
Potassium	7440-09-7	200.7	ND		5.0	mg/L	1
Selenium	7782-49-2	200.7	ND		0.010	mg/L	1
Silver	7440-22-4	200.7	ND	(	0.0050	mg/L	1
Sodium	7440-23-5	200.7	26		5.0	mg/L	3
Thallium	7440-28-0	200.7	ND		0.050	mg/L	1
Vanadium	7440-62-2	200.7	ND		0.050	mg/L	1
Zinc	7440-66-6	200.7	ND		0.020	mg/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

### Inorganic non-metals

Client: Shealy Environmental Services, Inc.

Description: Simstream Date Sampled:02/21/2008 1221

Date Received: 02/21/2008

Laboratory ID: JB21063-002

Matrix: Aqueous

Run 2	Prep Method	Analytical Method (Alkalinity) 310.1	Dilution 1	<b>Analysis Date</b> 03/11/2008 0030	Analyst IVC	Prep Date	Batch 74871	
1	350.2	(Ammonia - N ) 350.1	1	02/29/2008 1527	WD	02/28/2008 1902	74190	
1		(DOC) 415.1	1					
1		(Hardness (to) 130.2	1	02/27/2008 1818	IVC		74140	
1		(Specific Con) 120.1	1	02/26/2008 0143	IVC		73969	
1		(TOC) 415.1	1	03/02/2008 2012	PBC		74401	
1		(TSS) 160.2	1	02/26/2008 1718	PMM		73563	

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		310.1	81		10	mg/L	2
Ammonia - N (phenate)		350.1	ND		0.10	mg/L	1
DOC		415.1	Pending		1.0	mg/L	1
Hardness (total)		130.2	57		10	mg/L	1
Specific Conductance		120.1	322		2.00	umhos/cm	1
тос		415.1	9.9		1.0	mg/L	1
TSS		160.2	6.9		4.0	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Simstream Date Sampled:02/21/2008 1221 Date Received: 02/21/2008

Laboratory ID: JB21063-002

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 2017	KJC	02/22/2008 1320	73758
2	200.7	200.7	1	02/27/2008 1441	MNM	02/22/2008 1320	73758
3	200.7	200.7	1	03/03/2008 1837	MNM	03/02/2008 1518	74337

	CAS	Analytical					_
Parameter	Number	Method	Result	Q P	QL	Units	Run
Dissolved Aluminum	7429-90-5	200.7	ND	1	0.20	mg/L	1
Dissolved Antimony	7440-36-0	200.7	ND	0.	010	mg/L	2
Dissolved Arsenic	7440-38-2	200.7	ND	0.	010	mg/L	1
Dissolved Barium	7440-39-3	200.7	ND	0.	025	mg/L	1
Dissolved Beryllium	7440-41-7	200.7	ND	0.0	040	mg/L	1
Dissolved Cadmium	7440-43-9	200.7	ND	0.0	020	mg/L	1
Dissolved Calcium	7440-70-2	200.7	16		5.0	mg/L	1
Dissolved Chromium	7440-47-3	200.7	ND	0.0	050	mg/L	1
Dissolved Cobalt	7440-48-4	200.7	ND	0.	025	mg/L	1
Dissolved Copper	7440-50-8	200.7	0.0088	0.0	050	mg/L	1
Dissolved Iron	7439-89-6	200.7	ND		0.10	mg/L	1
Dissolved Lead	7439-92-1	200.7	ND	0	010	mg/L	1
Dissolved Magnesium	7439-95-4	200.7	ND		5.0	mg/L	1
Dissolved Manganese	7439-96-5	200.7	ND	0.	015	mg/L	1
Dissolved Nickel	7440-02-0	200.7	ND	0.	040	mg/L	1
Dissolved Potassium	7440-09-7	200.7	9.6		5.0	mg/L	1
Dissolved Selenium	7782-49-2	200.7	ND	0.	010	mg/L	1
Dissolved Silver	7440-22-4	200.7	ND	0.0	050	mg/L	1
Dissolved Sodium	7440-23-5	200.7	48		5.0	mg/L	3
Dissolved Thallium	7440-28-0	200.7	ND	0	050	mg/L	1
Dissolved Vanadium	7440-62-2	200.7	ND	0	050	mg/L	1
Dissolved Zinc	7440-66-6	200.7	0.092	0.	020	mg/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and > MDL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Simstream Date Sampled:02/21/2008 1221

Date Received: 02/21/2008

Laboratory ID: JB21063-002

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 2010	KJC	02/22/2008 1320	73758
2	200.7	200.7	1	02/27/2008 1434	MNM	02/22/2008 1320	73758
3	200.7	200.7	1	03/03/2008 2057	MNM	03/02/2008 1518	74337

	CAS	Analytical				_
Parameter	Number	Method	Result	Q PQL	Units	Run
Aluminum	7429-90-5	200.7	0.22	0.20	mg/L	1
Antimony	7440-36-0	200.7	ND	0.010	mg/L	2
Arsenic	7440-38-2	200.7	ND	0.010	mg/L	1
Barium	7440-39-3	200.7	ND	0.025	mg/L	1
Beryllium	7440-41-7	200.7	ND	0.0040	mg/L	1
Cadmium	7440-43-9	200.7	ND	0.0020	mg/L	1
Calcium	7440-70-2	200.7	16	5.0	mg/L	1
Chromium	7440-47-3	200.7	ND	0.0050	mg/L	1
Cobalt	7440-48-4	200.7	ND	0.025	mg/L	1
Copper	7440-50-8	200.7	0.014	0.0050	mg/L	1
Iron	7439-89-6	200.7	0.12	0.10	mg/L	1
Lead	7439-92-1	200.7	ND	0.010	mg/L	1
Magnesium	7439-95-4	200.7	ND	5.0	mg/L	1
Manganese	7439-96-5	200.7	ND	0.015	mg/L	1
Nickel	7440-02-0	200.7	ND	0.040	mg/L	1
Potassium	7440-09-7	200.7	9.9	5.0	mg/L	1
Selenium	7782-49-2	200.7	ND	0.010	mg/L	1
Silver	7440-22-4	200.7	ND	0.0050	mg/L	1
Sodium	7440-23-5	200.7	45	5.0	mg/L	3
Thallium	7440-28-0	200.7	ND	0.050	mg/L	1
Vanadium	7440-62-2	200.7	ND	0.050	mg/L	1
Zinc	7440-66-6	200.7	0.097	0.020	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

### Inorganic non-metals

Client: Shealy Environmental Services, Inc.

Description: Effluent

1

Date Sampled:02/20/2008 1200

Laboratory ID: JB21063-003

73563

Matrix: Aqueous

Date R	eceived: 02/21/20	08					
Run 2	Prep Method	Analytical Method (Alkalinity) 310.1	Dilution 1	Analysis Date 03/11/2008 0041	Analyst IVC	Prep Date	<b>Batch</b> 74871
1	350.2	(Ammonia - N ) 350.1	1	02/29/2008 1528	WD	02/28/2008 1902	74190
1		(Carbonaceous) 405.1	1	02/27/2008 1319	SLH	02/22/2008 0912	4272
1		(DOC) 415.1	1				
1		(Hardness (to) 130.2	1	02/27/2008 1826	IVC		74140
1		(Specific Con) 120.1	1	02/26/2008 0222	IVC		73969
1		(TOC) 415.1	1	03/02/2008 2031	PBC		74401

1

(TSS) 160.2

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		310.1	40		10	mg/L	2
Ammonia - N (phenate)		350.1	0.28		0.10	mg/L	1
Carbonaceous BOD, 5 day		405.1	ND		2.0	mg/L	1
DOC		415.1	Pending		1.0	mg/L	1
Hardness (total)		130.2	57		10	mg/L	1
Specific Conductance		120.1	384		2.00	umhos/cm	1
TOC		415.1	9.5		1.0	mg/L	1
TSS		160.2	10		4.0	mg/L	1

PMM

02/26/2008 1718

### Inorganic non-metals

Client: Shealy Environmental Services, Inc.

Description: Rec. Stream Date Sampled:02/20/2008 1000 Date Received: 02/21/2008

Laboratory ID: JB21063-004

Matrix: Aqueous

Run 1	Prep Method	Analytical Method (Alkalinity) 310.1	Dilution 1	<b>Analysis Date</b> 02/26/2008 0242	Analyst IVC	Prep Date	<b>Batch</b> 73963
1	350.2	(Ammonia - N ) 350.1	1	03/03/2008 1854	WD	03/03/2008 1200	74405
1		(DOC) 415.1	1				
1		(Hardness (to) 130.2	1	02/27/2008 1843	IVC		74140
1		(Specific Con) 120.1	1	02/26/2008 0233	IVC		73969
1		(TOC) 415.1	1	03/02/2008 2126	PBC		74401
1		(TSS) 160.2	1	02/25/2008 1618	PMM		73893

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		310.1	26		10	mg/L	1
Ammonia - N (phenate)		350.1	ND		0.10	mg/L	1
DOC		415.1	Pending		1.0	mg/L	1
Hardness (total)		130.2	35		10	mg/L	1
Specific Conductance		120.1	105		2.00	umhos/cm	1
гос		415.1	4.3		1.0	mg/L	1
TSS		160.2	ND		4.0	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

ND = Not detected at or above the PQL

J = Estimated result < PQL and > MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

HEALY Chain of Custody Record

DISTRIBUTION: WHITE & YELLOW Florum to Indonesiny with Sample(s), PMK-Fleis Client Copy

108 Variage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 70702

SHEALY ENVIRONMENTAL

**SERVICES** 

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Discurrent Municip F-AD-012 Effective Date: 08-04-02

Stealy Environmental Services, Inc. Document Number: F-AD-016 Revision Number: 6 Page: 10 1 Replaces Date: 09/22/06 Effective Date: 05/29/07

Sample Receipt Checklist (SRC)

eans of receipt: SESI	☐ Client ☐ UPS ☐ FedEx ☐ Airborne Exp ☐ Other
es No NAZ	1. Were custody seals present on the cooler?
es No NA	2. If custody seals were present, were they intact and unbroken?
ooler ID/temperature upon o	
	et Ice Blue Ice Dry Ice None
f response is No (or Yes for	14, 15, 16), an explanation/resolution must be provided.
res Not NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified?  PM notified by SRC, phone, note (circle one), other:  coolers received via commercial courier, PMs are to be notified immediately.
res No NA	4. Is the commercial courier's packing slip attached to this form?
es No NA	5. Were proper custody procedures (relinquished/received) followed?
CS No NA	6. Were sample IDs listed?
res No NA	7. Was collection date & time listed?
res No NA	8. Were tests to be performed listed on the COC or was quote # provided?
Cos No NA	9. Did all samples arrive in the proper containers for each test?
res No NA	10. Did all container label information (ID, date, time) agree with COC?
cs No NA	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
res No NA NA	12. Was adequate sample volume available?
es Z No NA NA	13. Were all samples received within % the holding time or 48 hours, whichever comes first?
res No NA	14. Were any samples containers missing?
Ces No P NA N	15. Were there any excess samples not listed on COC?
res 🗆 No 🗆 NA 🛭	16. Were bubbles present >"pea-size" (""or 6mm in diameter) in any VOA vials?
res 🗷 No 🗌 NA 🗌	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
es No No NA	18. Were all cyanide and/or sulfide samples received at a pH >12?
res 🗹 No 🗆 NA 🔲	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb
	(<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
(es No NA 2	20. Were collection temperatures documented on the COC for NC samples?
	st be completed for any sample(s) incorrectly preserved or with headspace.)
sample(s)coordingly in sample receiving	were received incorrectly preserved and were adjusted ing with(H <sub>2</sub> SO <sub>4</sub> ,HNO <sub>3</sub> ,HCl,NaOH) with the SR # (number)
Sample(s)	were received with bubbles >6 mm in diameter.
Sample(s)	were received with TRC >0.2 mg/L for NH3/
TKN/cyanide/BNA/pest/PCE	Nherb.
Toxicity sample(s)	were received with TRC >0.1 mg/L and were
malyzed by method 330.5.	
	,
orrective Action taken, if n	ecessary:
as client notified: Yes	
SI employee:	Date of response:
omments:	

#### **Report of Analysis**

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Lot Number: JB21068

Date Completed: 03/04/2008

Total and dissolved metal scans for Receiving Stream

**Grant Wilton**Project Manager

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This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



**NELAC No: E87653** NC DEHNR No: 329 SC DHEC No: 32010

### **Case Narrative** Shealy Environmental Services, Inc.

Lot Number: JB21068

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Sheaty Environmental Services, Inc. 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB21068

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Receiving Stream	Aqueous	02/20/2008 1000	02/21/2008
002	Filtration Blank	Aqueous	02/20/2008 1045	02/21/2008
003	Rec. Stream- Filtered	Aqueous	02/20/2008 1050	02/21/2008

(3 samples)

# Executive Summary Shealy Environmental Services, Inc.

Lot Number: JB21068

Sample	e Sample ID	Matrix	Parameter	Method	Result	Q Units	Page
001	Receiving Stream	Aqueous	Aluminum	200.7	0.33	mg/L	5
001	Receiving Stream	Aqueous	Barium	200.7	0.031	mg/L	5
001	Receiving Stream	Aqueous	Calcium	200.7	8.6	mg/L	5
001	Receiving Stream	Aqueous	Iron	200.7	1.1	mg/L	5
001	Receiving Stream	Aqueous	Manganese	200.7	0.047	mg/L	5
001	Receiving Stream	Aqueous	Sodium	200.7	7.6	mg/L	5
003	Rec. Stream- Filtered	Aqueous	Dissolved Calcium	200.7	7.8	mg/L	7
003	Rec. Stream- Filtered	Aqueous	Dissolved Iron	200.7	0.41	mg/L	7
003	Rec. Stream- Filtered	Aqueous	Dissolved Manganese	200.7	0.034	mg/L	7
003	Rec. Stream- Filtered	Aqueous	Dissolved Sodium	200.7	7.8	mg/L	7

(10 detections)

Client: Shealy Environmental Services, Inc.

Description: Receiving Stream

Date Sampled:02/20/2008 1000

Date Received: 02/21/2008

Laboratory ID: JB21068-001

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 2024	KJC	02/22/2008 1320	73758
2	200.7	200.7	1	02/27/2008 1507	MNM	02/22/2008 1320	73758
3	200.7	200.7	1	03/03/2008 1841	MNM	03/02/2008 1518	74337

Parameter	CAS Number	Analytical	Result	Q	PQL	Units	Run
Aluminum	7429-90-5	Method 200.7	0.33		0.20	mg/L	1
	7440-36-0	200.7	ND		0.010	mg/L	2
Antimony			ND		0.010	mg/L	1
Arsenic	7440-38-2	200.7				•	1
Barium	7440-39-3	200.7	0.031		0.025	mg/L	
Beryllium	7440-41-7	200.7	ND		0.0040	mg/L	1
Cadmium	7440-43-9	200.7	ND		0.0020	mg/L	1
Calcium	7440-70-2	200.7	8.6		5.0	mg/L	1
Chromium	7440-47-3	200.7	ND		0.0050	mg/L	1
Cobalt	7440-48-4	200.7	ND		0.025	mg/L	1
Copper	7440-50-8	200.7	ND		0.0050	mg/L	1
Iron	7439-89-6	200.7	1.1		0.10	mg/L	1
Lead	7439-92-1	200.7	ND		0.010	mg/L	1
Magnesium	7439-95-4	200.7	ND		5.0	mg/L	1
Manganese	7439-96-5	200.7	0.047		0.015	mg/L	1
Nickel	7440-02-0	200.7	ND		0.040	mg/L	1
Potassium	7440-09-7	200.7	ND		5.0	mg/L	1
Selenium	7782-49-2	200.7	ND		0.010	mg/L	1
Silver	7440-22-4	200.7	ND		0.0050	mg/L	1
Sodium	7440-23-5	200.7	7.6		5.0	mg/L	3
Thallium	7440-28-0	200.7	ND		0.050	mg/L	1
Vanadium	7440-62-2	200.7	ND		0.050	mg/L	1
Zinc	7440-66-6	200.7	ND		0.020	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Filtration Blank Date Sampled:02/20/2008 1045

Date Received: 02/21/2008

Laboratory ID: JB21068-002

Matrix: Aqueous

**Analytical Method Dilution Analysis Date** Analyst **Prep Date** Batch Run **Prep Method** 200.7 200.7 1 02/25/2008 2045 KJC 02/22/2008 1320 73758 1 200.7 02/22/2008 1320 73758 2 200.7 MNM 1 02/27/2008 1514 MNM 02/22/2008 1320 73758 3 200.7 200.7 03/03/2008 1846 1

	CAS	Analytical				
Parameter	Number	Method	Result	Q PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.7	ND	0.20	mg/L	1
Dissolved Antimony	7440-36-0	200.7	ND	0.010	mg/L	2
Dissolved Arsenic	7440-38-2	200.7	ND	0.010	mg/L	1
Dissolved Barium	7440-39-3	200.7	ND	0.025	mg/L	1
Dissolved Beryllium	7440-41-7	200.7	ND	0.0040	mg/L	1
Dissolved Cadmium	7440-43-9	200.7	ND	0.0020	mg/L	1
Dissolved Calcium	7440-70-2	200.7	ND	5.0	mg/L	1
Dissolved Chromium	7440-47-3	200.7	ND	0.0050	mg/L	1
Dissolved Cobalt	7440-48-4	200.7	ND	0.025	mg/L	1
Dissolved Copper	7440-50-8	200.7	ND	0.0050	mg/L	1
Dissolved Iron	7439-89-6	200.7	ND	0.10	mg/L	1
Dissolved Lead	7439-92-1	200.7	ND	0.010	mg/L	1
Dissolved Magnesium	7439-95-4	200.7	ND	5.0	mg/L	1
Dissolved Manganese	7439-96-5	200.7	ND	0.015	mg/L	1
Dissolved Nickel	7440-02-0	200.7	ND	0.040	mg/L	1
Dissolved Potassium	7440-09-7	200.7	ND	5.0	mg/L	1
Dissolved Selenium	7782-49-2	200.7	ND	0.010	mg/L	1
Dissolved Silver	7440-22-4	200.7	ND	0.0050	mg/L	1
Dissolved Sodium	7440-23-5	200.7	ND	5.0	mg/L	3
Dissolved Thallium	7440-28-0	200.7	ND	0.050	mg/L	1
Dissolved Vanadium	7440-62-2	200.7	ND	0.050	mg/L	1
Dissolved Zinc	7440-66-6	200.7	ND	0.020	mg/L	1

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Rec. Stream- Filtered

Date Sampled:02/20/2008 1050 Date Received: 02/21/2008

Laboratory ID: JB21068-003

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 2052	KJC	02/22/2008 1320	73758
2	200.7	200.7	1	02/27/2008 1521	MNM	02/22/2008 1320	73758
3	200.7	200.7	1	03/03/2008 1851	MNM	02/22/2008 1320	73758

	CAS	Analytical				
Parameter	Number	Method	Result	Q PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.7	ND	0.20	mg/L	1
Dissolved Antimony	7440-36-0	200.7	ND	0.010	mg/L	2
Dissolved Arsenic	7440-38-2	200.7	ND	0.010	mg/L	1
Dissolved Barium	7440-39-3	200.7	ND	0.025	mg/L	1
Dissolved Beryllium	7440-41-7	200.7	ND	0.0040	mg/L	1
Dissolved Cadmium	7440-43-9	200.7	ND	0.0020	mg/L	1
Dissolved Calcium	7440-70-2	200.7	7.8	5.0	mg/L	1
Dissolved Chromium	7440-47-3	200.7	ND	0.0050	mg/L	1
Dissolved Cobalt	7440-48-4	200.7	ND	0.025	mg/L	1
Dissolved Copper	7440-50-8	200.7	ND	0.0050	mg/L	1
Dissolved Iron	7439-89-6	200.7	0.41	0.10	mg/L	1
Dissolved Lead	7439-92-1	200.7	ND	0.010	mg/L	1
Dissolved Magnesium	7439-95-4	200.7	ND	5.0	mg/L	1
Dissolved Manganese	7439-96-5	200.7	0.034	0.015	mg/L	1
Dissolved Nickel	7440-02-0	200.7	ND	0.040	mg/L	1
Dissolved Potassium	7440-09-7	200.7	ND	5.0	mg/L	1
Dissolved Selenium	7782-49-2	200.7	ND	0.010	mg/L	1
Dissolved Silver	7440-22-4	200.7	ND	0.0050	mg/L	1
Dissolved Sodium	7440-23-5	200.7	7.8	5.0	mg/L	3
Dissolved Thallium	7440-28-0	200.7	ND	0.050	mg/L	1
Dissolved Vanadium	7440-62-2	200.7	ND	0.050	mg/L	1
Dissolved Zinc	7440-66-6	200.7	ND	0.020	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and > MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Number 70705	Owin Na	- ADEA	Analysis (Allach tas if show space to meeted )		8 101 CO-///	/ JBJ 1000	7 One B. Marke	> Filler 0,45 um	$\cap$				i openka krait ingrafii ingra maaka,		Date inte	Date Fine	100 me o 6h	necety term 3.9 c	Decembert Mandon F.A.C612 - Effective Date: 09-04-02
WICES, INC. 29172 (803) 791-9111	Tehnkura has Fax ha Fenod	Najuri No.		1/1000000		1 / KS/85/87	× <b>→</b>	*	×				Mothe: All scoringles and referenced for said overeits frasts respirited invitings wither arrangements are march.	Acad			The second contract c	JAB USE CMIT Procedures on young find the see that	
SHEALY ENVIRONMENTAL SERVICES, INC. 108 Vantage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111	Reporte Contact Thomas on	Oxide Supractive	x Clip bethin Thompson	Abanananan andara a	Mahix by Preservative Type	STATE OF THE PARTY	2		0				Sangyle Disposed	OC Hequienaria (Specify	2121/08 0 9 W 1. HOWERPER BY	246 Trink 2. Helaboot by	Dose Tree 8. Laboratory months		The state of the s
SHEALY Chain of Custody Record	SEST	Address 55	City Share Zip Code X	Propertions Déwherny/Louisa	Pisjest No.	Sample (U): Description (Containers for each sample may be contoring on one line.)	* Receiving Stream slade 1000	Filtration Blank sleeps 100	S - E Rond				Princible Mazard (desiffication):	Turn Arcund Thre frequires (Prior led approval required for excesses (41.) [1] Standard [1] Mysh (Specify)	1/2 Stemon	0	hed by	Coversiseds	<b>ОКТИНОТОМ:</b> ИТИТЕ & YELLOW-RESON 10 БОХВУУ ВЫЙ БИКИСКУ, ПИК-ТРОБЛЕН СХОУ

Shealy Environmental Services, Inc. Document Number: F-AD-016 Revision Number: 6 Pegs 1 of 1 Replaces Own: 09/22/06 Effective Date: 05/29/37

Sample Receipt Checklist (SRC)

No	nk Against Bottles
Yes         No         NA         2.           Cooler ID/temperature upon rece           Method:         Temperature upon rece           Method:         Temperature Blance           Method of coolant:         Wet Id           f response is No (or Yes for 14.           Yes         No           No         NA           <	If custody scals were present, were they intact and unbroken?  cipt
Method:	nk Against Bottles ce Blue Ice Dry Ice None  15, 16), an explanation/resolution must be provided.  If temperature of any cooler exceeded 6.0°C, was Project Manager notified?  PM notified by SRC, phone, note (circle one), other: (For coolers received via commercial courier, PMs are to be notified immediately.  Is the commercial courier's packing slip attached to this form?  Were proper custody procedures (relinquished/received) followed?  Were sample IDs listed?  Was collection date & time listed?  Were tests to be performed listed on the COC or was quote # provided?  Did all samples arrive in the proper containers for each test?  O. Did all container label information (ID, date, time) agree with COC?  1. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Method of coolant:	Against Bottles  ce Blue Ice Dry Ice None  15, 16), an explanation/resolution must be provided.  If temperature of any cooler exceeded 6.0°C, was Project Manager notified?  PM notified by SRC, phone, note (circle one), other: (For coolers received via commercial courier, PMs are to be notified immediately.  Is the commercial courier's packing slip attached to this form?  Were proper custody procedures (relinquished/received) followed?  Were sample IDs listed?  Was collection date & time listed?  Were tests to be performed listed on the COC or was quote # provided?  Did all samples arrive in the proper containers for each test?  O. Did all container label information (ID, date, time) agree with COC?  1. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Method of coolant:	Dry Ice None  15, 16), an explanation/resolution must be provided.  If temperature of any cooler exceeded 6.0°C, was Project Manager notified?  PM notified by SRC, phone, note (circle one), other: (For coolers received via commercial courier, PMs are to be notified immediately.  Is the commercial courier's packing slip attached to this form?  Were proper custody procedures (relinquished/received) followed?  Were sample IDs listed?  Was collection date & time listed?  Were tests to be performed listed on the COC or was quote # provided?  Did all samples arrive in the proper containers for each test?  Did all container label information (ID, date, time) agree with COC?  Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes     No     NA     4.       Yes     No     NA     4.       Yes     No     NA     5.       Yes     No     NA     6.       Yes     No     NA     7.       Yes     No     NA     9.       Yes     No     NA     10.       Yes     No     NA     1.	15, 16), an explanation/resolution must be provided.  If temperature of any cooler exceeded 6.0°C, was Project Manager notified?  PM notified by SRC, phone, note (circle one), other:
Yes       No       NA       4         Yes       No       NA       4         Yes       No       NA       5         Yes       No       NA       6         Yes       No       NA       7         Yes       No       NA       9         Yes       No       NA       1	If temperature of any cooler exceeded 6.0°C, was Project Manager notified?  PM notified by SRC, phone, note (circle one), other:
Yes         No         NA         4.           Yes         No         NA         4.           Yes         No         NA         5.           Yes         No         NA         6.           Yes         No         NA         8.           Yes         No         NA         9.           Yes         No         NA         1.	PM notified by SRC, phone, note (circle one), other:
Yes         No         NA         5.           Yes         No         NA         6           Yes         No         NA         7.           Yes         No         NA         9.           Yes         No         NA         10           Yes         No         NA         11	. Is the commercial courier's packing slip attached to this form?  . Were proper custody procedures (relinquished/received) followed?  . Were sample IDs listed?  . Was collection date & time listed?  . Were tests to be performed listed on the COC or was quote # provided?  . Did all samples arrive in the proper containers for each test?  6. Did all container label information (ID, date, time) agree with COC?  1. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes         No         NA         5.           Yes         No         NA         6           Yes         No         NA         7.           Yes         No         NA         9.           Yes         No         NA         10           Yes         No         NA         11	. Were proper custody procedures (relinquished/received) followed?  . Were sample IDs listed?  . Was collection date & time listed?  . Were tests to be performed listed on the COC or was quote # provided?  . Did all samples arrive in the proper containers for each test?  0. Did all container label information (ID, date, time) agree with COC?  1. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes     No     NA     6       Yes     No     NA     7       Yes     No     NA     8       Yes     No     NA     9       Yes     No     NA     1	Were sample IDs listed?  Was collection date & time listed?  Were tests to be performed listed on the COC or was quote # provided?  Did all samples arrive in the proper containers for each test?  Did all container label information (ID, date, time) agree with COC?  Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes         No         NA         7.           Yes         No         NA         8           Yes         No         NA         9.           Yes         No         NA         1.	Was collection date & time listed?  Were tests to be performed listed on the COC or was quote # provided?  Did all samples arrive in the proper containers for each test?  Did all container label information (ID, date, time) agree with COC?  Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes         No         NA         8           Yes         No         NA         9           Yes         No         NA         10           Yes         No         NA         1	Were tests to be performed listed on the COC or was quote # provided?  Did all samples arrive in the proper containers for each test?  Did all container label information (ID, date, time) agree with COC?  Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes     No     NA     9       Yes     No     NA     19       Yes     No     NA     1	Did all samples arrive in the proper containers for each test?  0. Did all container label information (ID, date, time) agree with COC?  1. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes         No         NA         Ji           Yes         No         NA         1	Did all container label information (ID, date, time) agree with COC?     Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes         No         NA         1	1. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes         No □         NA □         1.           Yes         No □         NA □         1.           Yes         □         No □         NA □         1.           Yes         □         No □         NA □         1.           Yes         □         No □         NA □         1.	
Yes No NA 11 Yes No NA 12 Yes No NA 14	Was adecuate sample volume available?
Yes   No   NA   1- Yes   No   NA   1- Yes   No   NA   1-	
Yes No No NA 1	<ol> <li>Were all samples received within ¼ the holding time or 48 hours, whichever comes first?</li> </ol>
Yes 🔲 No 🗗 NA 🔲 📋	4. Were any samples containers missing?
	5. Were there any excess samples not listed on COC?
Yes No Na 1	6. Were hubbles present >"pea-size" (\(\alpha\)" or 6mm in diameter) in any VOA vials?
Yes No NA 1	7. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes No NA NA	8. Were all cyanide and/or sulfide samples received at a pH >12?
Yes No NA NA	9. Were all applicable NH3/TKN/eyanide/phenol/BNA/pest/PCB/herb
	(<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes No NA 2 2	Were collection temperatures documented on the COC for NC samples?
Sample Preservation (Must be	e completed for any sample(s) incorrectly preserved or with headspace.)
Sample(s)	were received incorrectly preserved and were adjusted
accordingly in sample receiving	with (II-SO4,HNO,HCl,NaOH) with the SR # (number)
Sample(s)	were received with bubbles >6 mm in diameter.
Sample(s)	were received with TRC >0.2 mg/L for NH3/
TKN/cyanide/BNA/pest/PCB/he	<del></del>
Toxicity sample(s)	were received with TRC >0.1 mg/L and were
analyzed by method 330.5.	White Additional and a second and a second and a second and a second and
orrective Action taken, if nece	ssarv:
Vas client notified: Yes	No Did client respond: Yes No
ESI employee:	Date of response:
Comments:	and the supplied of the suppli

# ATA ESOURCES INC

ORDER ID: 080
SAMPLE ID: 080
PROJECT: DC
SAMPLE: Lat

080311X002 080311X002-01 DOC for WER Study Lab Control

Shealy Environmental Services Inc. c/o Elizabeth Thompson 106 Vantage Point Drive Cavce SC 29033

## ANALYSIS REPORT

DATA RESOURCES INC. 3005 BROAD RIVER ROAD COLUMBIA SC 29210 BUS: 803-561-0331 FAX: 803-561-0536

CUSTOMER ID: SESI JOB ID: J4239 DIVISION: DRC CREATED ON: 3/12/08 PAGE: 4

METHOD ANALYSIS D/T ANALYST PRIORITY ANALYSIS or SERVICE PERFORMED RESULT UNIT QUAL ROL MOL LOCATOR MATRIX: Liquid CUSTOMER SAMPLE ID: COLLECTED ON: 2008-02-21 COLLECTED BY: Elizabeth Thompson RECEIVED AT LAB: 2008-03-11 10:25:00.000 Dissolved Organic carbon by EPA 415.1/SM 5310C EPA 415.1/SM 5310C 2008-03-12 14:35 bparsons 1 Day Dissolved Organic Carbon RDI ma/L 0.50000

ONLINE ACCESS TO THIS INFORMATION: Go to http://DataResourcestnc.com and choose the menu option "CLIENT LOGIN" to enter the CDRC (Client Data Retrieval Center) and view PDF files of your invoices, analytical reports, correspondence and more...

CERTIFICATIONS: DRG SC490569 | DRG SC423108 | Doci20: 120335727.



ORDER ID: SAMPLE ID: PROJECT: SAMPLE: 080311X002 080311X002-02 DOC for WER Study Effluent

Sheaty Environmental Services Inc. c/o Elizabeth Thompson 106 Vantage Point Drive Cayce SC 29033

## ANALYSIS REPORT

DATA RESOURCES INC. 3005 BROAD RIVER ROAD COLUMBIA SC 29210 BUS: 803-561-0331 FAX: 803-561-0536

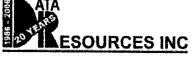
CUSTOMER ID: SESI JOB ID: J4239 DIVISION: DRC CREATED ON: 3/12/08 PAGE: 5

METHOD ANALYSIS D/T ANALYST PRIORITY ANALYSIS or SERVICE PERFORMED RESULT UNIT OUAL ROL MOL MATRIX: CUSTOMER SAMPLE ID: COLLECTED ON: 2008-02-20 COLLECTED BY: Elizabeth Thompson
RECEIVED AT LAB: 2008-03-11 10:25:00.000 Dissolved Organic carbon by EPA 415.1/SM 5310C EPA 415.1/SM 5310C 2008-03-12 14:45 boarsons 1 Day Dissolved Organic Carbon 0.50000 6 652 ma/L

ONLINE ACCESS TO THIS INFORMATION: Go to http://DataResourcesInc.com and choose the menu option "CLIENT LOGIN" to enter the CDRC [Client Data Retrieval Center] and view PDF files of your invoices, analytical reports, correspondence and more...

CERTIFICATIONS: DRC SC#40569 | DRG SC#23108

Doc/D: 1205357277



ORDER ID: SAMPLE ID: PROJECT: SAMPLE:

080311X002 080311X002-03 DOC for WER Study Receiving Room

Shealy Environmental Services Inc. c/o Elizabeth Thompson 106 Vantage Point Drive Cayce SC 29033

## ANALYSIS REPORT

DATA RESOURCES INC. 3005 BROAD RIVER ROAD COLUMBIA SC 29210 BUS: 803-561-0331 FAX: 803-561-0536

CUSTOMER ID: SESI JOB ID: J4239 DIVISION: DRC CREATED ON: 3/12/08 PAGE:

METHOD ANALYSIS D/T ANALYST PRIORITY ANALYSIS or SERVICE PERFORMED RESULT UNIT QUAL RDL MOL LOCATOR MATRIX: Liquid CUSTOMER SAMPLE ID: COLLECTED ON: 2008-02-20 COLLECTED BY: Elizabeth Thompson RECEIVED AT LAB: 2008-03-11 10:25:00.000

mo/L

Dissolved Organic carbon by EPA 415.1/SM 5310C Dissolved Organic Carbon 3.444

EPA 415.1/SM 5310C 2008-03-12 14:55 bparsons 0.50000

1 Day

ONLINE ACCESS TO THIS INFORMATION: Go to http://DataResourcesInc.com and choose the menu option "CLIENT LOGIN" to enter the CDRC [Client Data Retrieval Center] and view PDF files of your invoices, analytical reports, correspondence and more.

CERTIFICATIONS: DRC SC#40569 | DRG SC#23108 | DRG SC#2

Doc(D: 1205357277

**L**ESOURCES INC

ORDER ID: SAMPLE ID: PROJECT: SAMPLE:

080311X002 080311X002-04 DOC for WER Study

Shealy Environmental Services Inc. c/o Elizabeth Thompson 106 Vantage Point Drive Cayce SC 29033

ANALYSIS REPORT

DATA RESOURCES INC. 3005 BROAD RIVER ROAD COLUMBIA SC 29210 BUS: 803-561-0331 FAX: 803-561-0536

CUSTOMER ID: SESI JOB ID: DIVISION: CREATED ON: J4239 DRC 3/12/08

PAGE: METHOD ANALYSIS D/T ANALYST PRIORITY ANALYSIS or SERVICE PERFORMED RESULT UNIT QUAL RDL MDL LOCATOR MATRIX: CUSTOMER SAMPLE ID: Liquid 2008-02-21 COLLECTED ON: COLLECTED BY: Elizabeth Thompson RECEIVED AT LAB: 2008-03-11 10:25:00.000 Dissolved Organic carbon by EPA 415.1/SM 5310C EPA 415.1/SM 5310C 2008-03-12 15:06 bparsons 1 Day Dissolved Organic Carbon 0.50000 ma/L

ONLINE ACCESS TO THIS INFORMATION: Go to http://DataResourcesinc.com and choose the menu option "CLIENT LOGIN" to enter the CDRC [Client Data Retrieval Center] and view PDF files of your invoices, analytical reports, correspondence and more.

CERTIFICATIONS: DRC SC#40569 | DRG SC#23108 | DociD: 1205357.

### **Report of Analysis**

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Project Name: Louisa LW

Original copper values for LABWATER Sest

Lot Number: JB21071
Date Completed: 03/03/2008

**Grant Wilton**Project Manager

Acond 1 Willem



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



SC DHEC No: 32010 NELAC No: E87653 NC DEHNR No: 329

# Case Narrative Shealy Environmental Services, Inc.

Lot Number: JB21071

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB21071

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Lab Control	Aqueous	02/21/2008 1202	02/21/2008
002	0.25	Aqueous	02/21/2008 1208	02/21/2008
003	0.39	Aqueous	02/21/2008 1210	02/21/2008
004	0.60	Aqueous	02/21/2008 1211	02/21/2008
005	0.91	Aqueous	02/21/2008 1213	02/21/2008
006	1.4	Aqueous	02/21/2008 1214	02/21/2008
007	2.1	Aqueous	02/21/2008 1215	02/21/2008

<sup>(7</sup> samples)

# Executive Summary Shealy Environmental Services, Inc.

Lot Number: JB21071

Sample	Sample ID	Matrix	Parameter	Method	Result	Q Units	Page
	0.25	Agueous	Dissolved Copper	200.8	2.4	ug/L	7
	0.25	Aqueous	Copper	200.8	2.5	ug/L	8
003	0.39	Aqueous	Dissolved Copper	200.8	3.7	ug/L	9
003	0.39	Aqueous	Copper	200.8	3.6	ug/L	10
003	0.60	Aqueous	Dissolved Copper	200.8	5.8	ug/L	11
004	0.60	Aqueous	Copper	200.8	6.0	ug/L	12
005	0.91	Agueous	Dissolved Copper	200.8	9.1	ug/L	13
005	0.91	Aqueous	Copper	200.8	9.3	ug/L	14
006	1.4	Aqueous	Dissolved Copper	200.7	0.017	mg/L	15
006	1.4	Agueous	Copper	200.7	0.017	mg/L	16
007	2.1	Aqueous	Dissolved Copper	200.7	0.024	mg/L	17 .
007	2.1	Aqueous	Copper	200.7	0.024	mg/L	18

(12 detections)

Client: Shealy Environmental Services, Inc.

Description: Lab Control

Date Sampled:02/21/2008 1202

Date Received: 02/21/2008

Laboratory ID: JB21071-001

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date			Batch
1	200.2	200.8	1	02/27/2008 0102	FTS	02/22/2008 1630	73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1	

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Lab Control

Date Sampled:02/21/2008 1202

| Date Received: 02/21/2008

Laboratory ID: JB21071-001

Matrix: Aqueous

Dilution Analysis Date Analyst **Prep Date** Batch **Analytical Method** Run Prep Method 02/22/2008 1630 73802 02/27/2008 0053 FTS 200.8 200.2

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	ND		1.0	ug/L	1	

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 0.25

Date Received: 02/21/2008

Date Sampled:02/21/2008 1208

Laboratory ID: JB21071-002

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8		02/27/2008 0120		02/22/2008 1630	73802

Parameter	CAS Number	Analytical Method	Result	Q ·	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	2.4		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 0.25

Date Sampled:02/21/2008 1208

Date Received: 02/21/2008

Copper

Laboratory ID: JB21071-002

Matrix: Aqueous

Run 1	Prep Method 200.2	Analytical Method 200.8	Dilution 1	Analysis [ 02/27/2008		.,	<b>ep Da</b> 2/200	te 8 1630	<b>Batch</b> 73802			
Paran	neter			CAS Number	Analytica Method	l Resi	uit	Q	PQL	Units	Run	
Copp	er		7-	440-50-8	200.8	3 2	5		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

 $J = Estimated result < PQL and <math>\geq MDL$ 

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 0.39

Date Sampled:02/21/2008 1210

µ Date Received: 02/21/2008

Laboratory ID: JB21071-003

Matrix: Aqueous

Run 1	Prep Method 200.2	Analytical Method 200.8		Analysis E 02/27/2008		ilyst TS	Prep D 02/22/20	oate 008 1630	<b>Batch</b> 73802		
Param	neter			CAS Number	Analytica		Result	Q	PQL	Units	Run
	Ived Copper		74	440-50-8	200.	8	3.7	<u>.</u>	1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 0.39

Date Sampled:02/21/2008 1210

Date Received: 02/21/2008

Laboratory ID: JB21071-003

Matrix: Aqueous

Run	Prep Method	<b>Analytical Method</b>	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/27/2008 0129	FTS	02/22/2008 1630	73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	3.6		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"  $\,$  P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 0.60

Date Sampled:02/21/2008 1211

Date Received: 02/21/2008

Run

1

Laboratory ID: JB21071-004

Matrix: Aqueous

 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 200.2
 200.8
 1
 02/27/2008 0225
 FTS
 02/22/2008 1630
 73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	5.8		1.0	ug/L	1	

PQL = Practical quantitation limit
ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and > MDL

E = Quantitation of compound exceeded the calibration range

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 0.60

Date Sampled:02/21/2008 1211

Date Received: 02/21/2008

Laboratory ID: JB21071-004

Matrix: Aqueous

Run **Prep Method Analytical Method Dilution Analysis Date** Analyst **Prep Date** Batch 1 200.2 02/27/2008 0148 FTS 02/22/2008 1630 73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	6.0		1.0	ug/L	1

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and > MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Client: Shealy Environmental Services, Inc.

Description: 0.91

Date Sampled:02/21/2008 1213

) ate Received: 02/21/2008

Laboratory ID: JB21071-005

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/27/2008 0243	FTS	02/22/2008 1630	73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	9.1		1.0	ug/L	1	

ND = Not detected at or above the PQL

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

P =The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Client: Shealy Environmental Services, Inc.

Description: 0.91

Date Sampled:02/21/2008 1213

Date Received: 02/21/2008

Laboratory ID: JB21071-005

Matrix: Aqueous

Run **Prep Method Analytical Method** Dilution Analysis Date Analyst Prep Date Batch 3 200.2 200.8 02/29/2008 2256 1 FTS 02/28/2008 1212 74136

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200,8	9.3		1.0	ug/L	3	_

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 1.4

Date Sampled:02/21/2008 1214

Date Received: 02/21/2008

Laboratory ID: JB21071-006

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	<b>Analysis Date</b>	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 0034	KJC	02/22/2008 1120	73759

	CAS	Analytical		_			D	
Parameter	Number	Method	Result	Q	PQL	Units	Run	_
Dissolved Copper	7440-50-8	200.7	0.017		0.0050	mg/L	1	

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%  $J = Estimated result < PQL and <math>\geq MDL$ Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"  $\,$ 

Client: Shealy Environmental Services, Inc.

Description: 1.4

Date Sampled:02/21/2008 1214

Date Received: 02/21/2008

Laboratory ID: JB21071-006

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 0020	KJC	02/22/2008 1120	73759

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.017		0.0050	mg/L	1	

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

J = Estimated result < PQL and > MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 2.1

Run

1

Date Sampled:02/21/2008 1215

Date Received: 02/21/2008

Laboratory ID: JB21071-007

Matrix: Aqueous

Prep Date Batch **Dilution Analysis Date** Analyst **Prep Method Analytical Method** 02/25/2008 0122 KJC 02/22/2008 1120 73759 200.7 200.7

Analytical CAS **PQL** Units Run Result Q Parameter Number Method 0.0050 1 mg/L 200.7 0.024 7440-50-8 **Dissolved Copper** 

PQL = Practical quantitation limit

B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 2.1

Run

1

Date Sampled:02/21/2008 1215

Date Received: 02/21/2008

Laboratory ID: JB21071-007

Matrix: Aqueous

Prep Date Batch Dilution Analysis Date Analyst **Prep Method Analytical Method** 02/22/2008 1120 73759 02/25/2008 0054 KJC 200.7 200.7

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.024		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

# SHEALY Chain of Custody Record

HE EN' ∂NM

NC. VIC

Number 70703

106 Vantage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Client SEST				Repo	ort to C	Conta	ict The	mi	osor	า				Telej	ohone	No. /	Fax N	o. / E-	mail						Quote N	0.
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Project No.			P.O. No.		ab sosite		Matr	rix	. ,	No.	of Co				人			/	/	//	//	/	//		Lot	
Sample ID / Description (Containers for each sample may be con		ne line l	Date	Time	G=Gr C=Comp	Aqueous	Solid	4dueous	Unpres.	H2SO4	HC!	VaOH	5035 Kit	2	M.	/ / ŝ	7	//	/	//	//	//	//	//-	Remarks /	0 1071 Cooler I.D.
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Shealy Environmental Services, Inc. Document Number: F-AD-016 Revision Number: 6

Page 1 of 1 Replaces Date: 09/22/06 Effective Date: 05/29/07

Client:	SE	SI	Cooler Inspected by/date: <u>CB /02/21/08</u> ot #: <u>TB2107/</u>
Means of	receipt:	SESI	☐ Client ☐ UPS ☐ FedEx ☐ Airborne Exp ☐ Other
Yes 🗌	No 🗍	NA	1. Were custody seals present on the cooler?
Yes 🗍	No	NA	2. If custody seals were present, were they intact and unbroken?
			eceipt
Method: Method o	Ter of coolant:	mperature I	Blank Against Bottles et Ice Blue Ice Dry Ice None
If respon	se is No (	or Yes for	4, 15, 16), an explanation/resolution must be provided.
Yes 🗌	No 🗌	NA 🗷	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: (For coolers received via commercial courier, PMs are to be notified immediately.
Yes 🔲	No	NA	4. Is the commercial courier's packing slip attached to this form?
Yes	No 🗆	NA	5. Were proper custody procedures (relinquished/received) followed?
Yes Z	No 🗆	NA 🗌	6. Were sample IDs listed?
Yes Z	No 🗌	NA	7. Was collection date & time listed?
Yes Z	No 🗌	NA 🗌	8. Were tests to be performed listed on the COC or was quote # provided?
Yes Z	No 🗌	NA 🗌	9. Did all samples arrive in the proper containers for each test?
Yes 🗹	No 🗌	NA	10. Did all container label information (ID, date, time) agree with COC?
Yes Z	No 🗌	NA 🗌	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes 🗾	No 🗌	NA 🗌	12. Was adequate sample volume available?
Yes	No 🗆	NA 🗆	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes 🗌	No	NA 🗌	14. Were any samples containers missing?
Yes 🗌	No 🛃	NA 🗌	15. Were there any excess samples not listed on COC?
Yes 🗌	No 🗆	NA 🗾	16. Were bubbles present >"pea-size" (¼" or 6mm in diameter) in any VOA vials?
Yes	No	NA 🗌	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes 🗌	No 🗌	NA	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes	No 🗆	NA	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes 🗌	No 🗌	NA	20. Were collection temperatures documented on the COC for NC samples?
	reservat		t be completed for any sample(s) incorrectly preserved or with headspace.)
		ion (1vius	were received incorrectly preserved and were adjusted
Sample(s according	gly in sam	ple receivi	ng with( $H_2SO_4$ , $HNO_3$ , $HCl$ , $NaOH$ ) with the SR # (number)
Sample(s	1	<u>·</u>	were received with bubbles >6 mm in diameter.
			were received with Dubbles 5 0 min in Chambers.  were received with TRC > 0.2 mg/L for NH3/
Sample(s		/pest/PCB	
	sample(s)		were received with TRC >0.1 mg/L and were
analyzed	* ' '		THOIR I DOUGHOU THAN A THOU WITH ME DE THE CONTRACTOR OF THE PROPERTY OF THE P
<u>Corrective</u> Was client SESI empl	e Action 1 notified: oyee:	taken, if ne	
Comments	·		

### Report of Analysis

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Project Name: Louisa SS

Original copper values for SIMSTREAM

Lot Number: JB21070
Date Completed: 03/03/2008

**Grant Wilton**Project Manager

Acond 1 Wellow



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



SC DHEC No: 32010

**NELAC No: E87653** 

NC DEHNR No: 329

## Case Narrative Shealy Environmental Services, Inc.

Lot Number: JB21070

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB21070

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Lab Control	Aqueous	02/21/2008 1218	02/21/2008
002	Rec. Stream	Aqueous	02/21/2008 1219	02/21/2008
003	Simstream	Aqueous	02/21/2008 1222	02/21/2008
004	3.2	Aqueous	02/21/2008 1225	02/21/2008
005	4.9	Aqueous	02/21/2008 1230	02/21/2008
006	7.5	Aqueous	02/21/2008 1235	02/21/2008
007	11.6	Aqueous	02/21/2008 1236	02/21/2008
800	17.9	Aqueous	02/21/2008 1240	02/21/2008
009	27.5	Aqueous	02/21/2008 1243	02/21/2008
010	42.3	Aqueous	02/21/2008 1246	02/21/2008

(10 samples)

# **Executive Summary Shealy Environmental Services, Inc.**

Lot Number: JB21070

Sample	Sample ID	Matrix	Parameter	Method	Result	Q Units	Page
002	Rec. Stream	Aqueous	Dissolved Copper	200.8	2.4	ug/L	7
002	Rec. Stream	Aqueous	Copper	200.8	1.7	ug/L	8
003	Simstream	Aqueous	Dissolved Copper	200.8	7.8	ug/L	9
003	Simstream	Aqueous	Copper	200.8	15	ug/L	10
004	3.2	Aqueous	Dissolved Copper	200.7	0.040	mg/L	11
004	3.2	Aqueous	Copper	200.7	0.053	mg/L	12
005	4.9	Aqueous	Dissolved Copper	200.7	0.052	mg/L	13
005	4.9	Aqueous	Copper	200.7	0.067	mg/L	14
006	7.5	Aqueous	Dissolved Copper	200.7	0.075	mg/L	15
006	7.5	Aqueous	Copper	200.7	0.10	mg/L	16
007	11.6	Aqueous	Dissolved Copper	200.7	0.11	mg/L	17
007	11.6	Aqueous	Copper	200.7	0.14	mg/L	18
800	17.9	Aqueous	Dissolved Copper	200.7	0.15	mg/L	19
800	17.9	Aqueous	Copper	200.7	0.20	mg/L	20
009	27.5	Aqueous	Dissolved Copper	200.7	0.24	mg/L	21
009	27.5	Aqueous	Copper	200.7	0.31	mg/L	22
010	42.3	Aqueous	Dissolved Copper	200.7	0.36	mg/L	23
010	42.3	Aqueous	Copper	200.7	0.47	mg/L	24

(18 detections)

Client: Shealy Environmental Services, Inc.

Description: Lab Control

Date Sampled:02/21/2008 1218

Date Received: 02/21/2008

Laboratory ID: JB21070-001

Matrix: Aqueous

Prep Date Batch Prep Method **Analytical Method Dilution Analysis Date** Analyst Run 02/22/2008 1630 73802 02/26/2008 2321 FTS 200.2 200.8 1

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1	

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Lab Control

Laboratory ID: JB21070-001 Matrix: Aqueous

Date Sampled:02/21/2008 1218

| Date Received: 02/21/2008

**Prep Date** Batch Dilution Analysis Date Analyst Run **Prep Method Analytical Method** 02/26/2008 2312 FTS 02/22/2008 1630 73802 200.8 200.2 1

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	ND		1.0	ug/L	1	

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

 $J = Estimated result < PQL and <math>\geq MDL$ 

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Rec. Stream Date Sampled:02/21/2008 1219

| Date Received: 02/21/2008

Laboratory ID: JB21070-002

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/27/2008 0007	FTS	02/22/2008 1630	73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	2.4		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Rec. Stream

Date Sampled:02/21/2008 1219

Date Received: 02/21/2008

Laboratory ID: JB21070-002

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	200.2	200.8	1	02/29/2008 2237	FTS	02/28/2008 1212	74136

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	1.7		1.0	ug/L	2	

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Simstream

Date Sampled:02/21/2008 1222

Date Received: 02/21/2008

Laboratory ID: JB21070-003

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/27/2008 0043	FTS	02/22/2008 1630	73802

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	7.8		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Simstream

Date Sampled:02/21/2008 1222

Date Received: 02/21/2008

Laboratory ID: JB21070-003

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/27/2008 0034	FTS	02/22/2008 1630	73802

	CAS	Analytical		_	DO!	l Imita	Run	
Parameter	Number	Method	Result	<u> </u>	PQL	Units	Kun	_
Copper	7440-50-8	200.8	15		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

 $J = Estimated result < PQL and <math>\geq MDL$ 

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 3.2

Date Sampled:02/21/2008 1225

Date Received: 02/21/2008

Laboratory ID: JB21070-004

Matrix: Aqueous

RunPrep MethodAnalytical MethodDilutionAnalysis DateAnalystPrep DateBatch1200.7200.7102/25/2008 2106KJC02/22/2008 132073758

	CAS	Analytical	D 14	_	DOL	Units	Run	
Parameter	Number	Method	Result	Q	PQL	Units	- Kun	
Dissolved Copper	7440-50-8	200.7	0.040		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

4450

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 3.2

Date Sampled:02/21/2008 1225

| Date Received: 02/21/2008

Laboratory ID: JB21070-004

Matrix: Aqueous

Run 1	Prep Method 200.7	Analytical Method 200.7	Dilution 1	<b>Analysis</b> 02/25/2008		Analyst Prep Dat KJC 02/22/2008		<b>Batch</b> 73758		
Paran	neter			CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copp	er		7	440-50-8	200.7	0.053		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

DL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

 $J = Estimated result < PQL and <math>\geq MDL$ 

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 4.9

Date Sampled:02/21/2008 1230

Date Received: 02/21/2008

Laboratory ID: JB21070-005

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 2120	KJC	02/22/2008 1320	73758

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.052		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 4.9

Date Sampled:02/21/2008 1230

Date Received: 02/21/2008

Laboratory ID: JB21070-005

Matrix: Aqueous

Run 1	Prep Method 200.7	Analytical Method 200.7	<b>Analysis Date</b> 02/25/2008 2113		<b>Batch</b> 73758

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.067		0.0050	mg/L	1	

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

J = Estimated result < PQL and  $\geq$  MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 7.5

Date Sampled:02/21/2008 1235

Date Received: 02/21/2008

Laboratory ID: JB21070-006

Matrix: Aqueous

Run Prep Method 1 200.7		Analytical Method 200.7			ate Analyst 2303 KJC			<b>Batch</b> 73759		
Paran	neter			CAS Number	Analytical Method	Result	Q	PQL	Units	Run
	ived Copper		7-	440-50-8	200.7	0.075		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

 $J = Estimated result < PQL and <math>\geq MDL$ 

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 7.5

Run

1

Date Sampled:02/21/2008 1235

**Prep Method** 

200.7

Laboratory ID: JB21070-006

Matrix: Aqueous

rate Received: 02/21/2008

Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
200.7	1	02/24/2008 2257	KJC	02/22/2008 1120	73759

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.10		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 11.6

Date Sampled:02/21/2008 1236

| Date Received: 02/21/2008

Laboratory ID: JB21070-007

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/24/2008 2317	KJC	02/22/2008 1120	73759

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.7	0.11	•	0.0050	mg/L	1	

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 11.6

Date Sampled:02/21/2008 1236

Laboratory ID: JB21070-007

Matrix: Aqueous

Date Received: 02/21/2008

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/24/2008 2310	KJC	02/22/2008 1120	73759

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.14		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 17.9

Run

Date Sampled:02/21/2008 1240

**Prep Method** 

200.7

Date Received: 02/21/2008

Laboratory ID: JB21070-008

Matrix: Aqueous

Batch Dilution Analysis Date Analyst Prep Date **Analytical Method** 02/22/2008 1120 73759 02/24/2008 2331 KJC 200.7

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.15		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and > MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 17.9

Date Sampled: 02/21/2008 1240 Jate Received: 02/21/2008

Laboratory ID: JB21070-008

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/24/2008 2324	KJC	02/22/2008 1120	73759

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.20		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 27.5

Date Sampled:02/21/2008 1243

Laboratory ID: JB21070-009

Matrix: Aqueous

Jate Received: 02/21/2008

Run **Prep Method** 200.7 1

**Analytical Method** 

Dilution Analysis Date 02/24/2008 2359

Anaiyst KJC

Prep Date 02/22/2008 1120 73759

Batch

	CAS	Analytical					·	
Parameter	Number	Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.7	0.24		0.0050	mg/L	1	_

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 27.5

Date Sampled:02/21/2008 1243 )ate Received: 02/21/2008

Laboratory ID: JB21070-009

Matrix: Aqueous

Prep Date Batch **Dilution Analysis Date** Analyst **Prep Method Analytical Method** Run 02/24/2008 2338 KJC 02/22/2008 1120 73759 200.7 200.7 1

CAS Analytical Result Q PQL Units Run Parameter Number Method 200.7 0.31 0.0050 mg/L 1 Copper 7440-50-8

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: 42.3

Date Sampled:02/21/2008 1246

Date Received: 02/21/2008

Laboratory ID: JB21070-010

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/25/2008 0013	KJC	02/22/2008 1120	73759

	CAS	Analytical		<u>-</u>	201	Units	Dum	
Parameter	Number	Method	Result	u	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.7	0.36		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and > MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: 42.3

Date Sampled:02/21/2008 1246

Date Received: 02/21/2008

Laboratory ID: JB21070-010

Matrix: Aqueous

Batch Prep Date Analyst Run **Prep Method Analytical Method** Dilution Analysis Date 02/25/2008 0006 **KJC** 02/22/2008 1120 73759 200.7 200.7

	CAS	Analytical		_			_	
Parameter	Number	Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.7	0.47		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" P = The RPD between two GC columns exceeds 40%

# SHEALY Chain of Custody Record

NM AL STICET NC. HF/

106 Vantage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111 Number 70704

Report to Contact Client Telephone No. / Fax No. / E-mail Quote No. SEST Wavbill No. Address City State Zip Code Analysis (Attach list if more space is needed.) Proiect Name Louisa S.S. Lot No. P.O. No. Project No. No. of Containers Matrix by Preservative Type Sample ID / Description 5035 Kit Date Time HNO3 (Containers for each sample may be combined on one line. Remarks / Cooler I.D. 2/21/08 Lab Control 1218 Diss Cu Samples Rec. Stream 1219 have been 0.45 um X Simstream Giltered. 1222 2 3.2 1225 4.9 1230 7.5 1235 1236 11.6 2 1240 1243 27,5 1246 Possible Hazard Identification Sample Disposal Note: All samples are retained for six weeks from eceipt □ Non-Hazard □ Flammable □ Skin Irritant □ Poison □ Unknown ☐ Return to Client ☐ Disposal by Lab unless other arrangements are made. Turn Around Time Required (Prior lab approval required for expedited TAT.) QC Requirements (Specify) ☐ Standard ☐ Rush (Specify) 1. Received by Date Time 2. Relinquished by 2. Received by 3. Relinquished by Date Time Comments Ice Pack Received on ice (Circle) Yes, DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Shealy Environmental Services, Inc. Document Number: F-AD-016 ".evision Number: 6

Sample Receipt Checklist (SRC)

Page 1 of 1 Replaces Date: 09/22/06 Effective Date: 05/29/07

Client:	SES	I	Cooler Inspected by/date: CB /02/21/08 ot #: TB21070
Means of	receipt:	SESI	☐ Client ☐ UPS ☐ FedEx ☐ Airborne Exp ☐ Other
Yes 🗌	No 🗌	NA	1. Were custody seals present on the cooler?
Yes T	No	NA	2. If custody seals were present, were they intact and unbroken?
			eceipt
Method: Method o		mperature I	
If respons	se is No (	or Yes for 1	14, 15, 16), an explanation/resolution must be provided.
Yes	No 🗌	NA 🗾	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: (For coolers received via commercial courier, PMs are to be notified immediately.
Yes 🗌	No 🗌	NA 🗌	4. Is the commercial courier's packing slip attached to this form?
Yes	No 🗌	NA 🗌	5. Were proper custody procedures (relinquished/received) followed?
Yes 🖊	No 🗌	NA 🗌	6. Were sample IDs listed?
Yes 🗾	No 🗌	NA 🗌	7. Was collection date & time listed?
Yes 🖊	No 🗌	NA 🗌	8. Were tests to be performed listed on the COC or was quote # provided?
Yes 🖊	No 🗌	NA 🗌	9. Did all samples arrive in the proper containers for each test?
Yes 🖊	No 🗌	NA 🗌	10. Did all container label information (ID, date, time) agree with COC?
Yes 🖊	No 🗌	NA 🗌	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes 🗾	No 🗌	NA 🗌	12. Was adequate sample volume available?
Yes 🖊	No 🗌	NA 🗌	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes	No	NA	14. Were any samples containers missing?
Yes 🗌	No 🗾	NA 🗌	15. Were there any excess samples not listed on COC?
Yes	No 🗌	NA 🗌	16. Were bubbles present >"pea-size" (1/4" or 6mm in diameter) in any VOA vials?
Yes	No	NA 🗌	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes	No 🗌	NA	18. Were all cyanide and/or sulfide samples received at a pH >12?
			19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb
Yes 🔝	No L	NA 🗌	(<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes 🗌	No	NA	20. Were collection temperatures documented on the COC for NC samples?
	Preservat		st be completed for any sample(s) incorrectly preserved or with headspace.)
Sample(s		(11111	were received incorrectly preserved and were adjusted
according	gly in sam	ple receivi	ng with(H <sub>2</sub> SO <sub>4</sub> ,HNO <sub>3</sub> ,HCl,NaOH) with the SR # (number)
Sample(s	1)		were received with bubbles >6 mm in diameter.
Sample(s			were received with TRC >0.2 mg/L for NH3/
		A/pest/PCB	
	sample(s)		were received with TRC >0.1 mg/L and were
	by metho		
Correctiv Was client	e Action notified: loyee:	taken, if ne Yes [	

Final Copper Yalues for loxicity lests
SHEALY ENVIRONMENTAL SERVICES, INC.

#### **Report of Analysis**

#### Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Project Name: Finals

Lot Number: JB25009

Date Completed: 02/28/2008

**Grant Wilton**Project Manager

Heard A Willem

nelad

This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

# Case Narrative Shealy Environmental Services, Inc.

Lot Number: JB25009

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Shealy Environmental Services, Inc. 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB25009

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	LW Control	Aqueous	02/23/2008 1635	02/25/2008
002	LW 0.60	Aqueous	02/23/2008 1638	02/25/2008
003	LW 0.91	Aqueous	02/23/2008 1640	02/25/2008
004	LW 1.4	Aqueous	02/23/2008 1641	02/25/2008
005	SS Control	Aqueous	02/23/2008 1644	02/25/2008
006	Rec. Stream	Aqueous	02/23/2008 1645	02/25/2008
007	Simstream	Aqueous	02/23/2008 1647	02/25/2008
008	SS 11.6	Aqueous	02/23/2008 1648	02/25/2008
009	SS 17.9	Aqueous	02/23/2008 1650	02/25/2008
010	SS 27.5	Aqueous	02/23/2008 1651	02/25/2008
011	LW Blank	Aqueous	02/23/2008 1633	02/25/2008
012	SS Blank	Aqueous	02/23/2008 1643	02/25/2008

(12 samples)

# Executive Summary Shealy Environmental Services, Inc.

Lot Number: JB25009

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	LW 0.60	Aqueous	Dissolved Copper	200.8	4.8		ug/L	6
003	LW 0.91	Aqueous	Dissolved Copper	200.8	13		ug/L	7
004	LW 1.4	Aqueous	Dissolved Copper	200.7	0.014		mg/L	8
004	Rec. Stream	Aqueous	Dissolved Copper	200.8	1.4		ug/L	10
007	Simstream	Agueous	Dissolved Copper	200.8	8.7		ug/L	11
008	SS 11.6	Aqueous	Dissolved Copper	200.7	0.10		mg/L	12
009	SS 17.9	Aqueous	Dissolved Copper	200.7	0.15		mg/L	13
010	SS 27.5	Aqueous	Dissolved Copper	200.7	0.23		mg/L	14

(8 detections)

Client: Shealy Environmental Services, Inc.

Description: LW Control

Laboratory ID: JB25009-001 Matrix: Aqueous

Date Sampled:02/23/2008 1635

Date Received: 02/25/2008

Run

1

Prep Date Batch **Prep Method Analytical Method Dilution Analysis Date** Analyst 02/25/2008 1604 73895 02/28/2008 0046 **FTS** 200.2 200.8

Analytical CAS Q PQL Units Run Result Parameter Number Method 1.0 ug/L 1 7440-50-8 200.8 ND Dissolved Copper

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: LW 0.60

Date Sampled:02/23/2008 1638

| Date Received: 02/25/2008

**Dissolved Copper** 

Laboratory ID: JB25009-002

1.0

4.8

200.8

ug/L

Matrix: Aqueous

Run 1	Prep Method 200.2	Analytical Method 200.8	Dilution 1	Analysis I 02/28/2008		nalyst FTS	Prep Da 02/25/200		<b>Batch</b> 73895		
Param	neter			CAS	Analyt		Result	Q	PQL	Units	Run

7440-50-8

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and > MDL

P =The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: LW 0.91

Date Sampled:02/23/2008 1640

**Prep Method** 

200.2

Date Received: 02/25/2008

Laboratory ID: JB25009-003

Matrix: Aqueous

 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 200.8
 1
 02/28/2008 0104
 FTS
 02/25/2008 1604
 73895

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	13		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

J ≈ Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: LW 1.4

Date Sampled:02/23/2008 1641

Date Received: 02/25/2008

Laboratory ID: JB25009-004

Matrix: Aqueous

Run 1	Prep Method 200.7	Analytical Method Dilu 200.7		and it in any and a second		MNM 02/26/2008 1809		<b>Batch</b> 9 73987		
Paran	neter			CAS Number	Analytical Method	Result	Q	PQL	Units	Run
	lved Copper		7.	440-50-8	200.7	0.014		0.0050	mg/L	1

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: SS Control

Date Sampled:02/23/2008 1644

Date Received: 02/25/2008

Laboratory ID: JB25009-005

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/28/2008 0113	FTS	02/25/2008 1604	73895

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1	

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

 $J = Estimated result < PQL and <math>\geq MDL$ 

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Rec. Stream

Date Sampled:02/23/2008 1645

Date Received: 02/25/2008

Laboratory ID: JB25009-006

Matrix: Aqueous

Run 1	Prep Method 200.2	Analytical Method 200.8	Dilution 1	<b>Analysis Date</b> 02/28/2008 0122	 Prep Date 02/25/2008 1604	Batch 73895	

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	1.4		1.0	ug/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Simstream

Laboratory ID: JB25009-007

Matrix: Aqueous

Date Sampled:02/23/2008 1647

Run

Date Received: 02/25/2008 **Prep Method** 200.2

Prep Date Batch Analyst **Analytical Method Dilution Analysis Date** 02/28/2008 0131 FTS 02/25/2008 1604 73895 200.8 1

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.8	8.7		1.0	ug/L	1	

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%  $J = Estimated result < PQL and <math>\geq MDL$ Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: SS 11.6

Date Sampled:02/23/2008 1648

Date Received: 02/25/2008

Run

1

Laboratory ID: JB25009-008

Matrix: Aqueous

**Prep Date** Batch Analyst **Dilution Analysis Date** Prep Method **Analytical Method** 02/27/2008 1800 MNM 02/26/2008 1809 73987 200.7 200.7

Analytical CAS **PQL** Units Run Result Q Nu<u>mber</u> Parameter Method 0.0050 1 0.10 mg/L 200.7 7440-50-8 **Dissolved Copper** 

PQL = Practical quantitation limit ND = Not detected at or above the PQL B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: SS 17.9

Date Sampled:02/23/2008 1650

Date Received: 02/25/2008

Laboratory ID: JB25009-009

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	02/27/2008 1807	MNM	02/26/2008 1809	73987

	CAS	Analytical		_			<b>5</b>	
Parameter	Number	Method	Result	Q	PQL	Units	Run	
Dissolved Copper	7440-50-8	200.7	0.15		0.0050	mg/L	1	

PQL = Practical quantitation limit

B = Detected in the method blank

 $J = Estimated result < PQL and <math>\geq MDL$ 

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: SS 27.5

Date Sampled:02/23/2008 1651

Date Received: 02/25/2008

Laboratory ID: JB25009-010

Matrix: Aqueous

Run 1	Prep Method 200.7	Analytical Method 200.7	Dilution 1	Analysis I 02/27/2008		•	Prep D 02/26/20		<b>Batch</b> 73987		
Paran	neter			CAS Number	Analytica Method		Result	Q	PQL	Units	Run
	lved Copper		7	440-50-8	200.7		0.23		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

 $J = Estimated result < PQL and <math>\geq MDL$ ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%



106 Vantage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 70654

Client			Report to Contact						Telephone No. / Fax No. / E-mail							Qı	ıote No.	<u> </u>									
Address		Sample	er's S	Signa	ature				··· <u>·</u>	•				Wayt	oill No.	_	•								Pa	ge	of
City State Zip Co.		X Printed				<u> </u>					· · ·	٠	- [			_		Analy	sis (A	ttach i	ist if n	ore s	pace is	needed		<del> </del>	
Project Name													_						$\overline{/}$	7	7	//	7	/			
Project No.	P.O. No.		arab nposite		Matr	ix			o. of Prese																	Lot No.	
Sample ID / Description (Containers for each sample may be combined on one line.)	Date 1	Time	0=Con	Aqueous	Solid Non-	Aqueous	Unpres	H2SO4	HNO3	HCI	NaOH	5035 Kit		4.	$\angle$		_		_			$\angle$		/-	Rem	arks / Cod	oler I.D.
100 BRAK	2,27% 11	» 3.3.3																									
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Poṣṣible Hazard Identification  ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poiso					nple i Returr		osal Client		) Disp		_				^	Vote:						weeks are ma		receipt			
Turn Around Time Required (Prior lab approval required for a  ☐ Standard ☐ Rush (Specify)	expedited TAT.)							-	QC F	Requ	uirem	nents	i (Sp	ecify)													
1. Relinquished by		Date	9		T	ime			1. Re	ceiv	ed b	y -										Di	ate		Time		
2. Relinquished by		Date	9	,	7	ime			2. Re	ceiv	ed b	Dy .										Di	ate		Time		
3. Relinquished by	· · · · · · · · ·	Date	<del></del> -	•	T	ime			3. La	bora	itory	rece	ived	by								D.	ate		Time		
Comments									LAB Rece				Circl	e) Ye	es N	o lce	Pack					R	eceipt	Тетр		℃	

Shealy Environmental Services, Inc. Document Number: F-AD-016 vision Number: 6 Page 1 of 1 Replaces Date: 09/22/06 Effective Date: 05/29/07

vision Numb	er: 6		Communa Descript Checklist (SRC)
	_	_ ,	Sample Receipt Checklist (SRC)
Client:	ESI-	70%	Sample Receipt Checklist (SRC)  Cooler Inspected by/date: Cer 1/25/8 Lot #: JB 25009
2		SESI	Client UPS FedEx Airborne Exp Other
Means of			1. Were custody seals present on the cooler?
Yes	No 🔼	NA 📗	Were custody seals present on the coord?      If custody seals were present, were they intact and unbroken?
Yes	No	NA 🗌	
Cooler ID	/temperat	ure upon re	eccipt 7077
i	•		
Method:	Ten	npe <u>ra</u> ture E	
Method o	f coolant:		tice Blue ice Diy zee
If respons	se is No (	or Yes for 1	4, 15, 16), an explanation/resolution must be provided.
11 105pone			3 If temperature of any cooler exceeded b.0°C, was rioject Manager notified.
Yes 🔲	No□	NA 🗀	DM notified by SRC phone note (circle one), other:
103	1,0		coolers received via commercial courier, PMs are to be notified infinediately.
Yes 🗌	No 🗌	NA	4. Is the commercial courier's packing slip attached to this form?
Yes 🗹	No 🗌	NA 🗌	5. Were proper custody procedures (relinquished/received) followed?
Yes Z	No 🗌	NA []	6. Were sample IDs listed?
Yes Z	No 🗌	NA 🗌	7. Was collection date & time listed?
Yes Z	No 🗌	NA 🗌	8 Were tests to be performed listed on the COC or was quote # provided?
	No 🗌	NA 🗌	9. Did all samples arrive in the proper containers for each test?
Yes /	No 🗌	NA .	10 Did all container label information (ID, date, time) agree with COC?
Yes /	No 🗆	NA 🗌	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes		NA 🗌	12. Was adequate sample volume available?
Yes /	No 📗	INAL	13. Were all samples received within ½ the holding time or 48 hours, whichever
Yes	No 🗌	NA 🗌	comes first?
77 - 1	Not	NA 🗌	14. Were any samples containers missing?
Yes		NA 📗	15 Word there any excess samples not listed on COC?
Yes	No L		16. Were bubbles present >"pea-size" (¼"or 6mm in diameter) in any VOA
Yes 🗌	No 🗌	NA	vials?
" <del></del>	1	NIA I	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes 7	No	NA .	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes	No _	NA 🗾	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb
Yes 🔲	No 🗌	NA 🗂	(<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
			20. Were collection temperatures documented on the COC for NC samples?
Yes	No	NA -	20. Were collection temperatures documented on the 300 by the second of with headspace.)
Sample 1	Preservat	tion (Mus	at be completed for any sample(s) incorrectly preserved or with headspace.)
Sample(s	3)		were received incorrectly preserved and were adjusted
accordin	gly in san	ple receivi	ng with(H <sub>2</sub> SO <sub>4</sub> ,HNO <sub>3</sub> ,HCl,NaOH) with the SR # (number)
		·	
Sample(s			were received with bubbles >6 mm in diameter.
Sample(s			were received with TRC >0.2 mg/L for NH3/
TKN/cva	nide/BN	A/pest/PCB	/herb.
	sample(s)		were received with TRC >0.1 mg/L and were
analyzed	by metho	od 330.5.	
analyzed	. by mean	)	
	o Action	taken, if n	
Was alien	t notified	Yes [	Did client respond: Yes No
			Date of response:
Omment	<u> </u>		
<del></del>			

#### Report of Analysis

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 Attention: Beth Thompson

Lot Number: **JB21065**Date Completed: 03/03/2008

Date Revised: 03/03/2008

Lab Equipment Blanks

Acond 1 Willem

**Grant Wilton**Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.



SC DHEC No: 32010 NELAC No: E87653 NC DEHNR No: 329

# Case Narrative Shealy Environmental Services, Inc.

Lot Number: JB21065

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

# Sample Summary Shealy Environmental Services, Inc.

Lot Number: JB21065

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Labwater Cylinder	Aqueous	02/20/2008	02/21/2008
002	Labwater Substock	Aqueous	02/20/2008	02/21/2008
003	Simstream Cylinder	Aqueous	02/20/2008	02/21/2008
004	Simstream Substock	Aqueous	02/20/2008	02/21/2008
005	Simstream Carboy	Aqueous	02/20/2008	02/21/2008
006	Pickle Jar 1	Aqueous	02/18/2008	02/21/2008
007	Pickle Jar 2	Aqueous	02/18/2008	02/21/2008

(7 samples)

#### **Executive Summary**

### Shealy Environmental Services, Inc.

Lot Number: JB21065

Sample	e Sample ID	Matrix	Parameter	Method	Result Q	Units	Page
001	Labwater Cylinder	Aqueous	Copper	200.8	1.3	ug/L	5
003	Simstream Cylinder	Aqueous	Copper	200.8	1.6	ug/L	7
006	Pickle Jar 1	Aqueous	Copper	200.8	4.6	ug/L	10

<sup>(3</sup> detections)

Client: Shealy Environmental Services, Inc.

Description: Labwater Cylinder

Date Sampled:02/20/2008 Date Received: 02/21/2008 Laboratory ID: JB21065-001

Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	02/26/2008 0147	FTS	02/22/2008 1630	73801

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	1.3		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Labwater Substock

200.2

Date Sampled:02/20/2008 Date Received: 02/21/2008

2

Laboratory ID: JB21065-002

Matrix: Aqueous

Prep Method **Analytical Method Dilution Analysis Date** Run

200.8

1

**Analyst** 03/03/2008 1305 FTS

**Prep Date** 02/22/2008 1630 73801

Batch

CAS Analytical Result Q **PQL** Units Run **Parameter** Number Method 1.0 2 ND ug/L 200.8 7440-50-8 Copper

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

J = Estimated result < PQL and > MDL

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Simstream Cylinder

Date Sampled:02/20/2008 Date Received: 02/21/2008 Laboratory ID: JB21065-003

Matrix: Aqueous

**Prep Method Analytical Method Dilution Analysis Date** Analyst Prep Date Batch Run 02/22/2008 1630 73801 1 200.2 200.8 02/26/2008 0206 FTS

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	1.6		1.0	ug/L	1	

E = Quantitation of compound exceeded the calibration range

J = Estimated result < PQL and ≥ MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Client: Shealy Environmental Services, Inc.

Description: Simstream Substock

Date Sampled:02/20/2008

Laboratory ID: JB21065-004

Matrix: Aqueous

Date Received: 02/21/2008 Run

**Prep Method** 200.2 **Analytical Method** 200.8

**Dilution Analysis Date** 02/26/2008 0243 1

Analyst FTS

**Prep Date** 02/22/2008 1630 73801

Batch

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and > MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

P = The RPD between two GC columns exceeds 40%

Client: Shealy Environmental Services, Inc.

Description: Simstream Carboy

Date Sampled:02/20/2008 Date Received: 02/21/2008 Laboratory ID: JB21065-005

Matrix: Aqueous

Prep Date Batch **Analytical Method** Analyst **Prep Method Dilution Analysis Date** Run 02/22/2008 1630 73801 02/26/2008 0252 FTS 200.8 200.2 1

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	ND		1.0	ug/L	1	

J = Estimated result < PQL and ≥ MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

Client: Shealy Environmental Services, Inc.

Description: Pickle Jar 1

Date Sampled:02/18/2008
Date Received:02/21/2008

Laboratory ID: JB21065-006

Matrix: Aqueous

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 200.2
 200.8
 1
 02/26/2008 0301
 FTS
 02/22/2008 1630
 73801

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run	
Copper	7440-50-8	200.8	4.6		1.0	ug/L	1	

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J ≠ Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Client: Shealy Environmental Services, Inc.

Description: Pickie Jar 2 Date Sampled:02/18/2008 Date Received: 02/21/2008

Laboratory ID: JB21065-007

Matrix: Aqueous

Prep Date **Batch** Analyst Dilution Analysis Date Run **Prep Method Analytical Method** 02/22/2008 1630 73801 02/26/2008 0310 FTS 200.8 200.2 1

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

SHEALY (	Chain	of (	Custody	Record
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106 Vantage Point Drive West Columbia, South Carolina 29172 Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number

Opcument Number, F-AD-012 - Effective Date, 08-04-02

70648

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(Containers for each sample may be combined on one line.		\$		\$ 1	3	\$ \$2 E	¥ g	0035 KN	<u> </u>	$\lambda_{\lambda}$	_	Z.	_	_	_	$\angle$	$\angle$	$\angle$		Parriants / Co	
Labrater Culinder	2/2/08	61	4			И			1												
Labryater Substock		G	V			14			\ <u>\</u>												
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Pickle Jar 1	2/18/06	4	1			1			1												
Dickle Jar 2	410/00	4	<u> </u>			14			1												
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Chelsea Dua	<b>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</b>	2/21	100	1678 141	D	T. Pleca	erwa b	¥	n en september som en en	•••••••••	-				···· wymacii		TO:	atë		Тапе	NAME OF THE PARTY
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Page I of I Shealy Environmental Services, Inc. Replaces Date: 00/22/06 Document Number: 5-AD-D1¢ Effective Date: 05/29/07 Revision Number, 6 Sample Receipt Checklist (SRC) Cooler Inspected by/date: <u>C5 /03/21/08</u> of #: <u>TB21065</u> Client: Other ☐ UPS ☐ FedEx Airborne Exp Means of receipt: Z SESI Client No NA 1. Were custody seals present on the cooler? No NA P 2. If custody seals were present, were they intact and unbroken? Cooler ID/temperature upon receipt 17/8 °C эC Against Bottles Method: Temperature Blank Method of coolant: Wet Ice Bluc Ice Dry Ice - None If response is No (or Yes for 14, 15, 16), an explanation/resolution must be provided. 3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? Yes 🔲 NA 🗌 PM notified by SRC, phone, note (circle one), other: coolers received via commercial courier, PMs are to be notified immediately. NA 4. Is the commercial courier's packing slip attached to this form? Were proper custody procedures (relinquished/received) followed? No NA Yes 🗷 No NA Were sample IDs listed? Was collection date & time listed? Were tests to be performed listed on the COC or was quote # provided? NA Did all samples arrive in the proper containers for each test? 10. Did all container tabel information (ID, date, time) agree with COC? No NA [ Did all containers arrive in good condition (unbroken, lids on, etc.)? No NA No NA Was adequate sample volume available? Were all samples received within 1/2 the holding time or 48 hours, whichever Yes 7 No 🗌 NA 🗌 comes first? No Yes NA [ Were any samples containers missing? Were there any excess samples not listed on COC? No 🕶 NA Yes Were bubbles present "pea-size" (1/4" or 6mm in diameter) in any VOA NA 🗾 Yes 🗌 No [ vials? NAL Were all metals/O&G/HEM/marrient samples received at a pH of <2? Yes No No Were all cyanide and/or sulfide samples received at a pH >12? Yes 19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb NAT Yes No (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine? Were collection temperatures documented on the COC for NC samples? Yes No INA (Must be completed for any sample(s) incorrectly preserved or with headspace.) were received incorrectly preserved and were adjusted Sample(s) accordingly in sample receiving with (H,SO,HNO,HCl,NaOH) with the SR # (number) were received with bubbles >6 mm in diameter. Sample(s) were received with TRC > 0.2 mg/L for NH3/ Sample(s) TKN/cyanide/BNA/pest/PCB/herb. were received with TRC > 0.1 mg/L and were Toxicity sample(s) analyzed by method 330.5. Corrective Action taken, if necessary: Yes No Was client notified: Did client respond: Yes No Date of response: SESI employee: Comments:

# SHEALY ENVIRONMENTAL SERVICES, INC. ACUTE REFERENCE TOXICANT CONTROL CHART FOR C.DUBIA REFERENCE TOXICANT = CUPRIC CHLORIDE MARCH 2008

Values normalized to hardness of 25 mg/l

Data Point	Test Date	LC50 (48Hours)								
1	05/10/06	2.457								
2	06/07/06	2.089								
3	06/28/06	3.449								
4	08/09/06	2.217								
5	08/30/06	2.159								
6	09/13/06	3.147								
7	09/27/06	2.668								
8	10/25/06	2.995								
9	11/29/06	2.33								
10	12/13/06	2.565								
11	01/17/07	2.494								
12	03/15/07	2.582								
13	05/16/07	2.178								
14	05/25/07	3.482								
15	06/21/07	2.248								
16	07/18/07	1.895								
17	07/25/07	1.832								
18	08/22/07	3.553								
19	12/18/07	2.311								
20	01/22/08	2.56								
	MEAN	2.56055								
	SD	0.513914234								
	2(SD)	1.027828467								
	UPPER LIMIT =3.59 UG/L LOWER LIMIT = 1.53 UG/L									

